CORRELATION OF NON STRESS TEST WITH FETAL OUTCOME IN HIGH RISK PREGNANACY AT TERTIARY HOSPITAL - A PROSPECTIVE STUDY

DISSERTATION

SUBMITTED TO

THE TAMIL NADU Dr. M.G.R MEDICAL UNIVERSITY

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

M. S. OBSTETRICS AND GYNAECOLOGY

Branch II

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DECLARATION

In the following pages is presented a consolidated report of the study **"CORRELATION OF NON STRESS TEST WITH FETAL OUTCOME IN HIGH RISK PREGNANACY AT TERTIARY HOSPITAL"**, on cases studied and followed up by me at Sree Mookambika Institute of Medical Sciences, Kulasekharam from 2016-2019. This thesis submitted to the Dr. M.G.R. Medical University, Chennai in partial fulfilment of the rules and regulations for the award of MS Degree examination in Obstetrics and Gynecology.

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This is to certify that this dissertation work titled "**CORRELATION OF NON STRESS TEST WITH FETAL OUTCOME IN HIGH RISK PREGNANACY AT TERTIARY HOSPITAL**" of the candidate Dr. Astha Bhutiyani with registration Number 221616601 for the award of DOCTOR OF SURGERY in the branch of Obstetrics and Gynaecology [Branch-II]. I personally verified the urkund.com website for the purpose of plagiarism Check. I found that the uploaded thesis file contains from introduction to conclusion pages and result shows 2 percentage of plagiarism in the dissertation.

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Change is the end result of all true learning. In this journey experience matters a lot. It gives a direction to our knowledge when sincerely analyse the cases and come out with something new. I am very happy that the research study has given me an opportunity to enhance the knowledge in the area of my studies.

In the process of learning and preparation of the dissertation, I have been guided by several eminent personalities directly and indirectly. First of all, I would like to thank my guide Dr. Rema V. Nair **M.S.,** *Professor, Department of Obstetrics and Gynaecology for her constant encouragement, inspiration, and continuous support throughout my studies, analysis of the cases and preparation of this thesis. A small pat on the back of a student can create wonders. I am grateful to all my teachers for their constant advice, immense help and answering all my queries all through the process of my study. I am really impressed by the extensive support and assistance. A good environment would bring good results in my research work; I feel so when I am surrounded by all fellow resident and my friends.. My thanks are due to our statistician for helping my study statistically and analytically sound.. I will never forget the blessings of God for guiding me spiritually and my parents for supporting in every moments of my education.*

Dr. Astha Bhutiyani

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ACOG	-	American College of Obstetrician and Gynaecology
AFI	-	Amniotic Fluid Index
AFV	-	Amniotic Fluid Volume
AT	-	Admission test
bpm	-	Beats Per Minute
BPP	-	Biophysical Profile
BTBV	-	Beat To Beat Variability
CF	-	Cord F actor
CPD	-	Cephalopelvic Disproportion
CST	-	Contraction Stress Test
CTG	-	Cardiotocography
Decel	-	Deceleration
DFMC	-	Daily Foetal Movement Count
ECG	-	Electrocardiography
EDD	-	Expected Date of Delivery
EFM	-	Electronic Foetal Monitoring
EFW	-	Estimated Foetal Wight
FAST	-	Foetal Acoustic Stimulation Test
FD	-	Foetal Distress
FH	-	Foetal heart
FHR	-	Foetal Heart Rate
FI	-	Failed induction
FIGO	-	Federation of International Gynaecological and Obstetric
FM	-	Foetal Movement
FTP	-	Failure to progress
GA	-	Gestational Age
GDM	-	Gestational Diabetes Mellitus
IUGR	-	Intra Uterine Growth Restriction
IUI	-	Intra Uterine Insemination
IVF	-	Invitro Fertilisation
LMP	-	Last Menstrual Period
LQ	-	Liquor Quantity
LSCS	-	Lower Segment Caesarean Section
MBPP	-	Modified Biophysical Profile
Mod	-	Mode of Delivery
NICU	-	Neonatal Intensive Care Unit

ABSTRACT

Introduction

Perinatal outcome can be improved by timely prediction of antenatal risk factors contributing to complications, by providing appropriate antenatal surveillance. Non stress test has the capacity to identify danger to the in utero fetus, which ensures well-timed intervention in order to attain best possible outcome.

Aim of the study:

To evaluate the role of NST in high risk pregnancy with relation to perinatal outcome.

Materials and methods

The study was carried out in the Department of OBG, Sree Mookambika Institute of Medical Sciences, Kulasekharam over a period of 16 months. OPD Patients from Obstetrics and Gynecology department were included in the study. After thorough clinical examination, patients were subjected to NST. Clinical and NST data from the study was recorded as per the proforma.

Result:

In high risk pregnant women, it was noticed that there was more fetal distress compare to normal pregnant women. The high risk group had a higher value of non-stress test compare to low risk group. There is high association between NST and low APGAR score at 5 min. Most common, indication for LSCS was fetal distress followed by GDM in High risk group , but previous LSCS in low risk group.

Elderly primi was the commonest risk factor.

Discussion:

The present study was conducted on 92 singleton pregnancies with and without risk factors and evaluated with NST. Reactive is when there are at least 2 accelerations of fifteen heart beats per minute for at least fifteen seconds above the baseline ,within twenty minutes ,observation time. The criterion for fetuses less than 32 weeks is different; at least 2 accelerations from baseline rate of ten heart beats per minute for at least ten seconds within twenty minutes.

The time gap for repeating non stress test is seven days ,on an average for high risk pregnancy at 35 weeks ,but more frequent testing is advocated for women with post-term pregnancy, multiple gestation, patients with gestational diabetes mellitus, intrauterine fetal growth restriction or gestational hypertension. In these cases, additional testing. biweekly or more is indicated.

Conclusion:

NST is simple, cheap, non-harmful, non-invasive, easily repeated, and cost effective with low maintenance profile and needs less training. It plays a crucial role in the monitoring of high risk pregnancies and henceforth, help to evaluate the optimal time for delivery and management.

Key words: High risk group, low risk group, perinatal outcome, NST.

INTRODUCTION

During the latter half of the twentieth century, various new techniques of antepartum fetal surveillance were invented, which have contributed significantly to a striking reduction in perinatal mortality and morbidity. One of the biophysical methods, which is being extensively used in the management of high risk pregnancies is Non Stress Test .High risk pregnancy is one which is complicated by factor that adversely affects the pregnancy outcome maternal or perinatal or both.[1]

Non stress test has the capacity to identify danger to the in utero fetus, which ensures well-timed intervention in order to attain best possible outcome. High risk pregnancy is one that can unfavorably affect the mother and / or newborn in the neonatal period .It is estimated that one fourth of the pregnancies, fit this group.

Non Stress Test is basic, easy, uncomplicated and noninvasive and one which can be easily repeated, whenever required.[2-5.]

Non stress test is based on the fact that prolonged absence of fetal heart acceleration is noted in the presence of fetal hypoxemia[5, 6.] Non Stress Test is classified as reactive and non-reactive.[7 ,8]

The factors that make up the basis of this test and provide information of fetal well being are,

- The range of fetal heart rate is 110-160 beats per minute.
- Tachycardia: more than 160 beats per minute, bradycardia less than 110 beats per minute.

- Beat to beat variability of the fetal heart rate.
- The presence or absence of accelerations.

The underlying principle of a non-stress test:

Non stress test is based on the fact that fetal movement is associated with fetal heart rate accelerations- which in turn indicates an intact central nervous system.[3] In the presence of fetal acidemia and the resultant hypoxia and neurological depression, though there is an initial increase in heart rate, the prolonged exposure results in a decreased rate.

Gestational age influences acceleration or reactivity of heart rate.[4]

Motherhood is an experience, one filled with a spectrum of emotions. Though a joyful event, it is not always smooth sailing! It is true especially in recent years, as there has been an overall increase of complicated and precious pregnancies. This increase is attributed to the changing lifestyle that has been the trend in the modern world, an after effect of urbanization, industrialization and the increased incidence of late conception in order to pursue career goals by the parents.

With acceptance of small family norm it has become necessary that every wanted conception should successfully end in birth of viable healthy baby.In order to ensure this, close monitoring for assessment of fetal wellbeing is required especially for high risk pregnancy.[1]

Non stress test is easily available, inexpensive, non- invasive method that is used to monitor the pregnancy. It is an investigation that is easily reproduced, as and

when required. In view of this, we conducted this study titled "Correlation of NST with fetal outcome in high risk pregnancy at a tertiary hospital". In order to evaluate the role of non-stress test in a high risk pregnancy, with the objective to see if an abnormal non stress test can be used to predict adverse perinatal outcome and to see if non stress test can adequately detect fetal distress at an early stage and thus help in decision making.

The study also correlated the importance of early registration and regular antenatal check up in the case of all pregnancies, thus ensuring early noting of high risk cases and their proper management. This definitely plays an important role in reducing perinatal morbidity and mortality in Kanyakumari district of Tamil Nadu.

AIMS AND OBJECTIVES

The aims and objectives of the present study are as follows:

- To evaluate the role of Non-Stress test in pregnancy that is at risk to poor perinatal outcome.

- To see if Non-Stress test in pregnancy can aid in the detection of fetal distress at an early stage and to assess its usefulness in decision making.

HYPOTHESIS AND SCIENTIFIC JUSTIFICATION OF THE STUDY:

The hypothesis of this study is NST can predict adverse perinatal outcome in high risk pregnancies.

Risk factors associated with pregnancy can bring about unfavourable perinatal outcomes in fetus such as fetal distress requiring emergency LSCS, SGA, NICU admission etc. With early antenatal evaluation, unfavourable outcome of fetus can be predicted and subjected to timely intervention in unfavourable situation. Hence early detection and improved treatment is required to increase number of favourable perinatal outcome. The effective diagnosis and management of perinatal morbidity and mortality involves multidisciplinary approach to their screening. This study will help in timely diagnosis & intervention in high risk pregnant women with fetal distress and decrease perinatal mortality and morbidity

REVIEW OF LITERATURE

History of fetal surveillance:

Marsac, first heard fetal heart sounds in the early 1600's. The likelihood that fetal pulse is a helpful tool regarding confirmation of the good health of the fetus in utero, was first discussed by Killian in the1600's .[9-12]

This however was ignored until Mayor and Kergaradec in the year 1818 and explained in depth regarding the technique of auscultation of the fetal heart sounds by keeping the ear at the side of the maternal abdomen. Kergaradec in addition suggested that fetal heart sounds could be utilized to decide fetal well - being and the fetal viability.[9-12]

Evory Kennedy in the year 1893 published the basic principles that guide the detection of distress in the intrauterine fetus. Evory Kennedy also suggested that auscultation of the fetal heart sounds could be used as a method of detection of intra-partum fetal distress and strongly recommended its usage in intra- partum monitoring. [9-12]

Von Winkel in the year 1893 recognized criterion for identification of distress in the intrauterine fetus and this has practically stayed the same ever since.

The criteria that were set by Von Winkel in the year 1893,is as follows:[9-12,13]

- Tachycardia that is defined as the fetal heart rate>160bpm.
- Bradycardia is fetal heart rate at or less than 100bpm.

- Irregular heart rate.
- Passage of meconium.
- Gross alteration of fetal movement

By the end of the 20th century, etiology for these factors were confirmed. Fetal tachycardia was noted in association with fever, while bradycardia was seen in cases of head and/or cord compression. Hyper stimulated uterine activity resulted in a characteristic heart rate pattern in association with asphyxia.

Different variations of fetal heart rate were used to formulate, pointers of fetal distress. Beat-to-beat variability of the fetal heart rate was depicted as a marker of good fetal health in 1968. Acceleration of fetal heart rate was observed to be associated to good fetal health. Ruttegers and co - workers noted the importance of accelerations in fetal heart rate as direct prognostic sign for perinatal outcome in the year 1972.[14]

Hammacher and co - workers in the year 1972 in their research study concentrated fundamentally on fetal heart rate attributes in those patients with no exogenous stress factors.

Hammacher and co - workers also stated that an acoustic or mechanical stimulus: thought to be utilized when the baby displayed a quiet silent" or "narrowed undulatory pattern (5-10 beats per minute) to guarantee that the baby is not asleep.[15]

Treiweiler M.W and co - workers in the year 1976, built up a positive correlation between absent fetal reactivity and positive stress test.[17]

Non-Stress Test (NST):

The concept of non-stress test has acquired clarity, under the research work of Freeman in the year 1975 .[18] It was he and his colleagues who introduced the Non-Stress Test, to measure the foetal heart rate acceleration in response to the movements of the intrauterine fetus, as a sign of good health. The explanation for this was partial occlusion of the umbilical vein, which results in reduction of fetal blood pressure and resultant hypoxia, which triggers the autonomic nervous system.[19-21]

The non-stress test is an investigative modality that is non-invasive, easily performed and interpreted and readily accepted by patients. This test involves the use of Doppler detected foetal heart rate acceleration coincident with foetal movements perceived by the mother. [22]

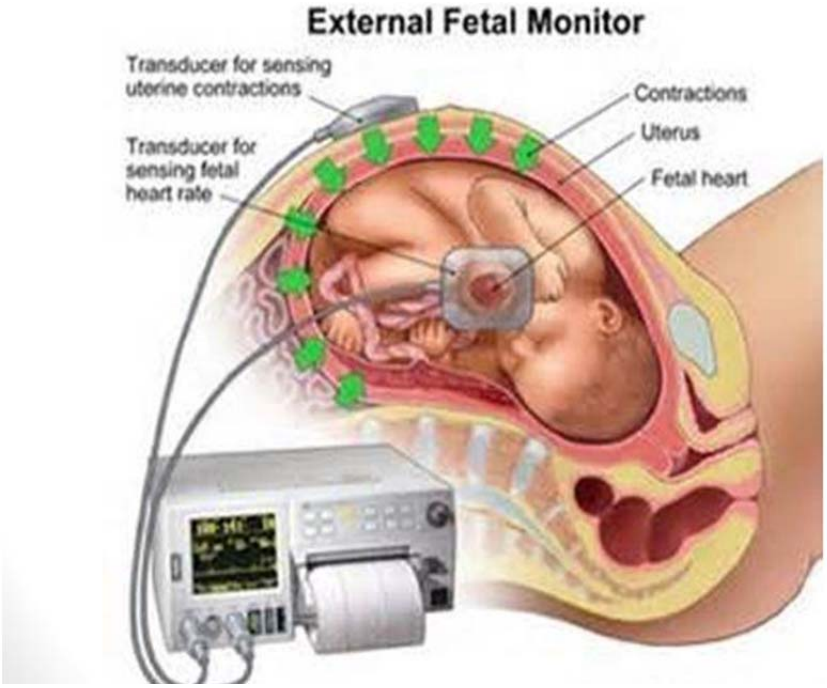


Figure 1: Non-Stress Test

Figure 2: Apparatus for Non-Stress Test

The variables that are evaluated in the non-stress test are:

- The baseline fetal heart rate.
- The variability of the fetal heart rate.
- The presence or absence of acceleration from the baseline fetal heart rate, if present, to be noted.

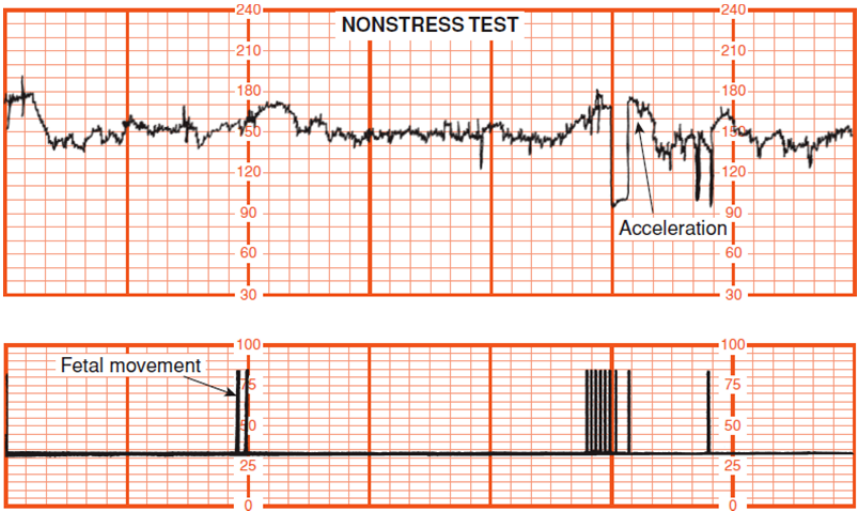


Figure 3: Normal Non Stress Test Graph[22]

The non-stress test is an important component of the fetal biophysical profile .The other factors include fetal breathing, fetal movements, muscle tone and amniotic fluid volume. [22]

Interpretation of the non-stress test:

FIGO recommended a classification with three patterns of fetal heart rate, normal, suspicious and pathological, while the classification adopted by the ACOG on Obstetric Practice uses the terms- reassuring and non-reassuring to describe patterns of fetal heart rate.[23-24] The National Institute of Clinical Excellence and The RCOG of the United Kingdom have defined these parameters in terms of reassuring, non-reassuring and abnormal in order to interpret the non-stress test.[25]

There are no intra-partum diagnostic tests of fetal condition that can indicate the eventual outcome in terms of neurological deficit, later in life.

It is a known fact that different fetuses show evidence of different outcome in response to identical conditions and fetal heart rate patterns.

The time gap for repeating non stress test is seven days,on an average for high risk pregnancy at 35 weeks,but more frequent testing is advocated for women with post-term pregnancy, multiple gestation, patients with gestational diabetes mellitus, intrauterine fetal growth restriction or gestational hypertension. In these cases, additional testing. biweekly or more is indicated.[26]

Interpretation of NST:

The normal non stress test:-

The heart rate of the fetus at the base line is in the range of 110 to 160 heartbeats per minute. Reactive is when there are at least 2 accelerations of fifteen heart beats per minute for at least fifteen seconds above the baseline, within twenty minutes, observation time.

The criterion for fetuses less than 32 weeks is different; at least 2 accelerations from baseline rate of ten heart beats per minute for at least ten seconds within twenty minutes.

Non-reactive:-

- No acceleration after twenty minutes or forty minutes testing period.
- No acceleration after twenty minutes in such situation, continue the test for 20 minutes further, if still no acceleration noted, then do a contraction stress test or biophysical profile.

The abnormalities of non-stress test:

Abnormal results include-

1. Heart rate less than 110/minute or more than 160/minute.
2. Baseline fluctuation of less than five beats per minute,
3. Absence of accelerations.
4. The presence of decelerations.

Decelerations are of three varieties:-

1. **Early decelerations or type I** when present, are indicative of head compression and is usually harmless and does not produce hypoxia or acidosis, hence not a cause of concern.

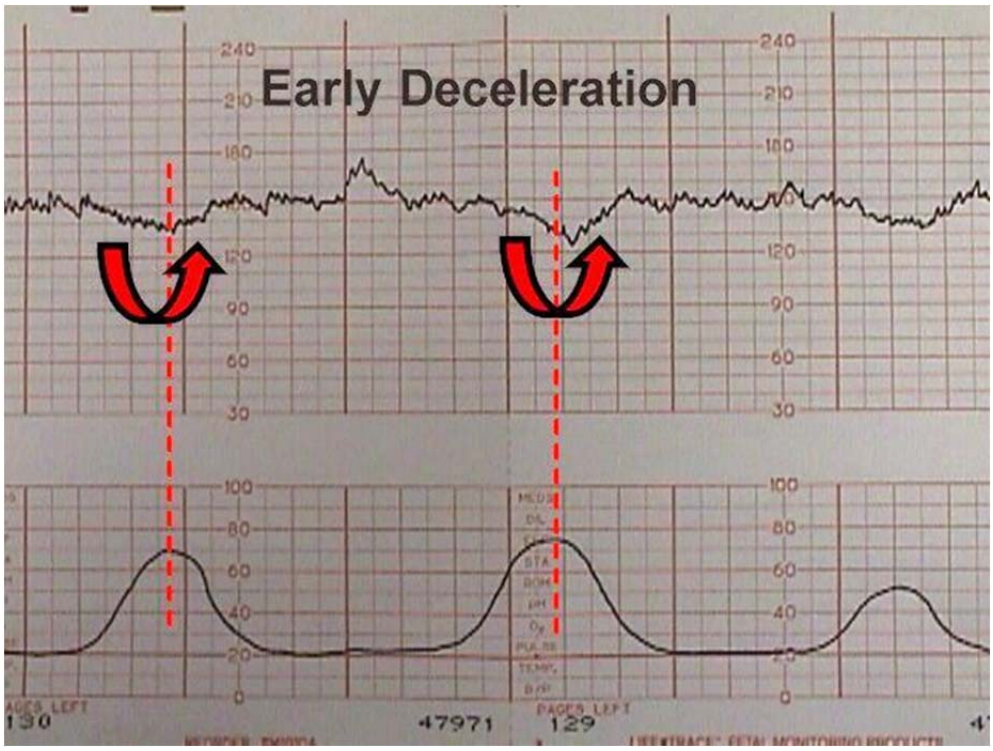


Figure 4: Non Stress Test Graph showing Early Decelerations

2. **Late decelerations or Type II** changes, when present are indicative of the utero-placental insufficiency.

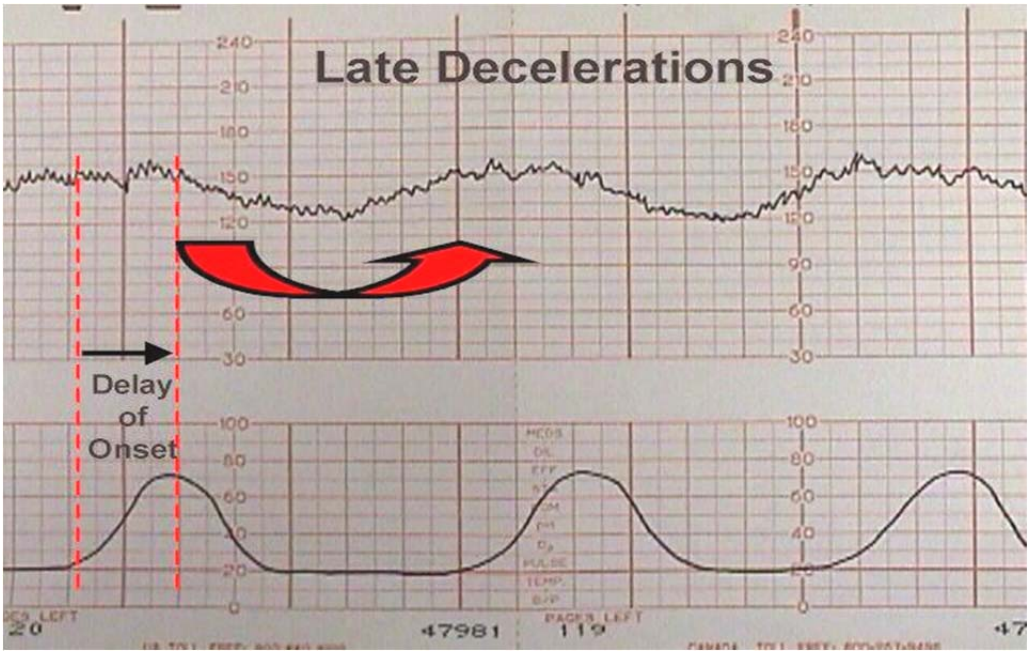


Figure 5: Non Stress Test showing Late Deceleration

3. **Variable decelerations** caused by cord compression. May disappear with change in the position of the mother.[2]

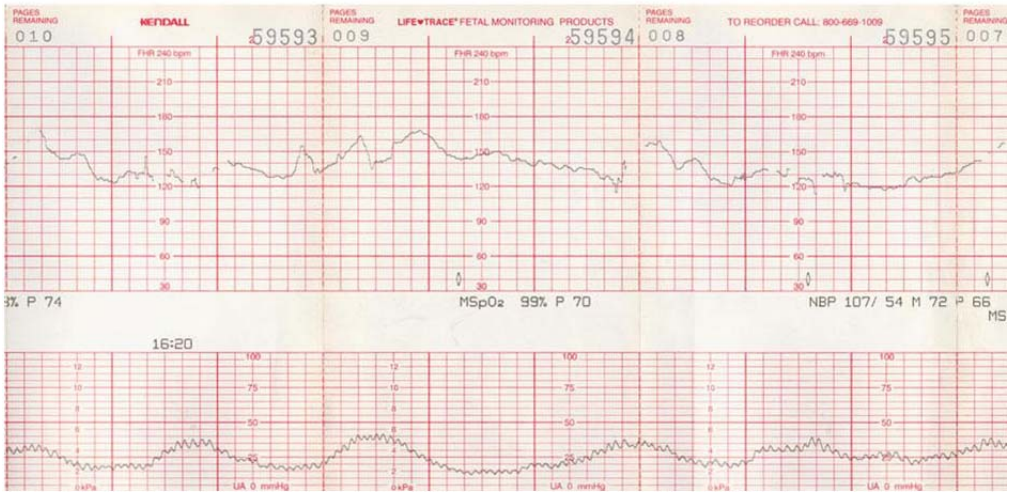


Figure 6: Non Stress Test graph showing Variable decelerations

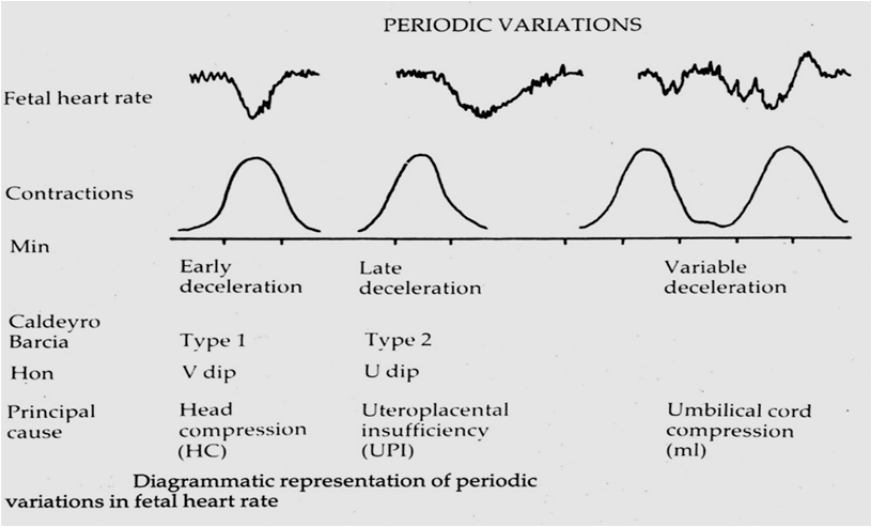


Figure 7: Comparison of the various types of Decelerations.

Tachycardia

Tachycardia is defined as the sustained increase of the baseline fetal heart rate more than 160 beats per minute.

This can be a normal response to some augmented need for oxygen, that is unrelated to the fetus - example: maternal causes like maternal pyrexia or simply because of the increased fetal activity .The other causes of tachycardia are as follows-

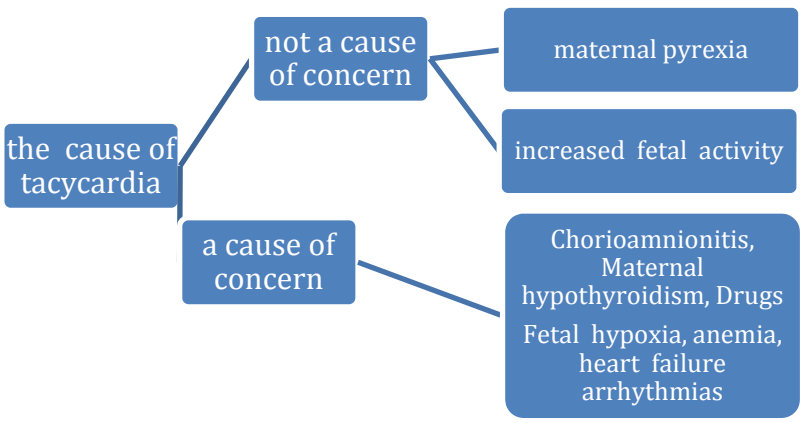


Figure 8: Causes of fetal tachycardia

Tachycardia is not indicative of fetal jeopardy, particularly in the absence of any other fetal heart rate abnormalities.

Figure 9: Graphical representation of fetal heart abnormalities- tachycardia

Bradycardia

Bradycardia is referred to as the sustained depression of fetal heart rate below 120 beats per minute during intrauterine life and 110 at full term.

Most of these are caused by amplified vagal tone,rarely congenital cardiac abnormalities.

Mild bradycardia is referred to as the continuous reduction of the fetal heart rate at its baseline below 80 beats per minute with preservation of beat-to-beat variability. This is a relatively common finding during the second stage of the labour andis not of great concern as long as the delivery, takes place quickly.

Moderate to severe bradycardia is referred to as the continuous reduction of the fetal heart rate below baseline to less than 80 beats per minute and it is associated with the loss of beat to beat variability and is at times found with late decelerations and is a cause of concern as it is suggestive of fetal distress and hypoxia and it requires prompt resolution.

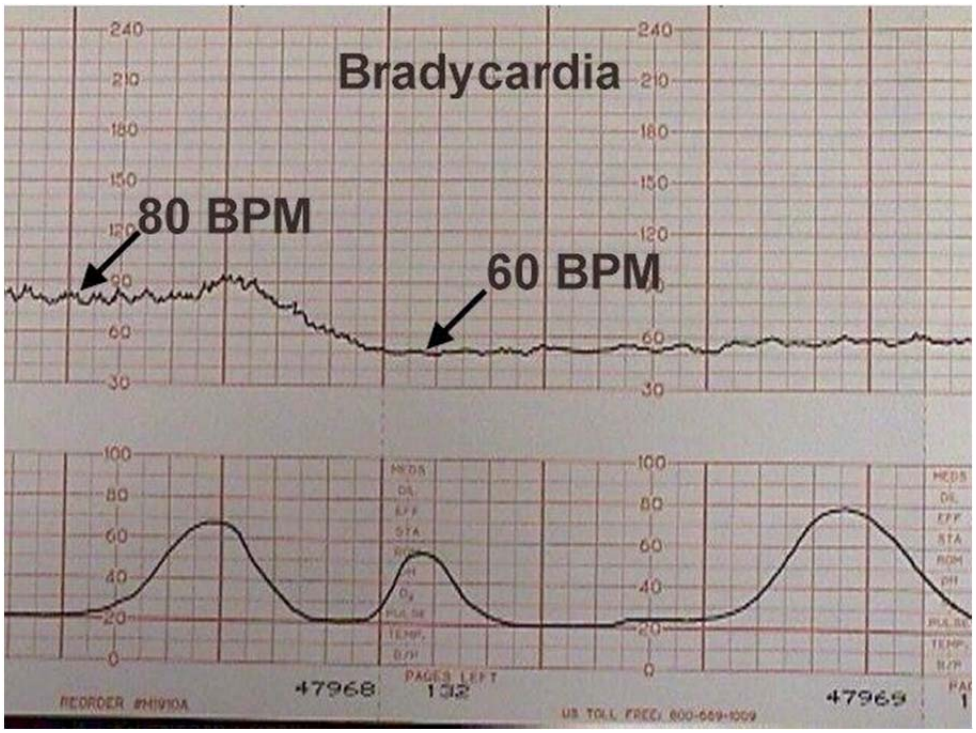


Figure 10: Non Stress test showing abnormal fetal heart rate-bradycardia

VARIABILITY

Variability is under the influence of the fetal brain via the sympathetic and parasympathetic influences. Reduction in the variability occurs normally during fetal sleep and usually returns to normal after 20 to 40 minutes.

The normal fetal heart rate baselines ranges from 120 to 160 beats per minute and has both short and long-term variability.

Short term variability:

Short term variability refers to the fact that momentarily the fetal heart increases slightly and then decreases and this variation is most often restricted to the range of 3-5 beats per minute from the baseline fetal heart rate.

Reduced variability may also occur:

- Under the influence of narcotics.
- In the presence of various fetal anomaly.
- May indicate that there is an injury to the fetus
- When there occurs a combination of both hypoxia and acidosis.

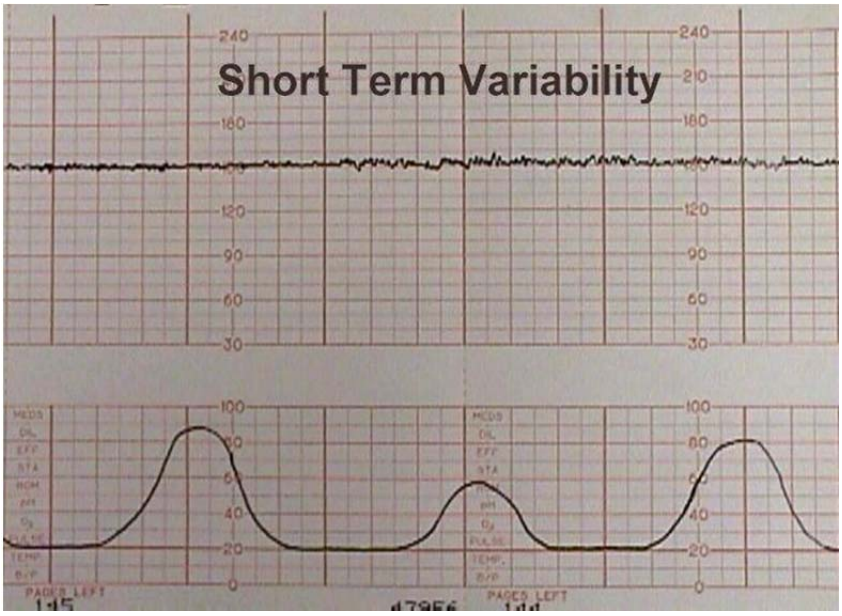


Figure 11: Non Stress Test graph showing short term variability

Long term variability

Long-term refers to the fact that the variability is of a longer duration and usually represents broad-based changes in the fetal heart rate or a waveform pattern that occurs repeatedly in a minute's time

Fetal heart acceleration is a type of long term variability pattern that occurs in response to fetal movements and most often are15 beats per minute above the baseline fetal heart rate lasts for10-20seconds.

It is possible to provoke fetal heart acceleration, at the time of pelvic examination by the stimulation of the fetal scalp during pelvic examination and is a sign that is reassuring, regarding the wellbeing of the baby.[22,26,55]

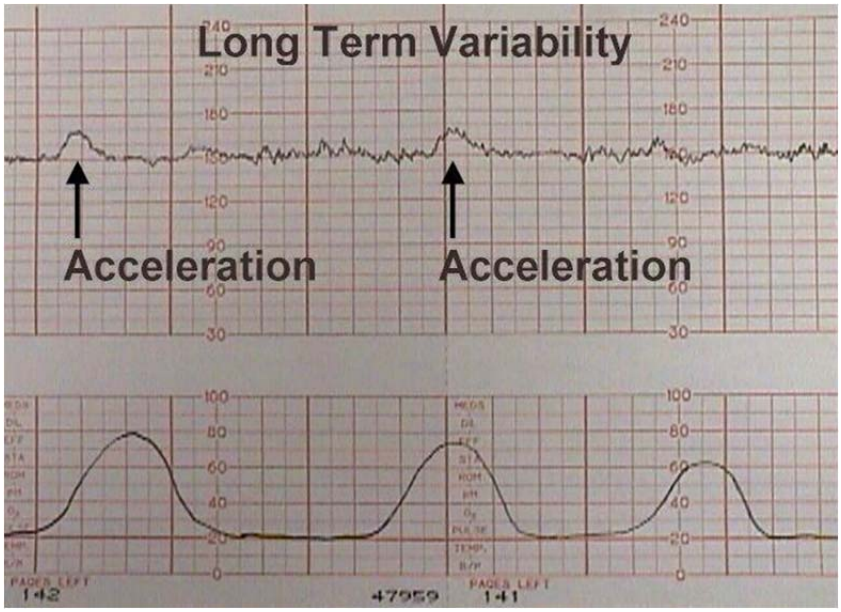


Figure 12: Non Stress Test graph showing long term variability

Literature Survey of the present study:

Freeman and co-workers in the year 1975 introduced the concept of non-stress test to describe fetal heart rate acceleration in response to fetal movement, a sign of fetal health[18]

Keegan Kirk A and coworkers used non stress test as an outpatient procedure and found that it was reasonable in screening at risk patients and it required very little time.[27]

Evertson Larry Rand coworkers in their study of two thousand four hundred and twenty-two cases found that sixty four percent[one thousand five hundred forty-seven of the total number of cases] cases studied were reactive and eight hundred twenty-nine accounting for thirty five percent of the total cases were nonreactive. Evaluation of the prenatal deaths within a week of delivery, 3.3 percent belonged to the non reactive non stress group and 1 percent belonged to the reactive group.[28]

Smith Carl V and coworkers in their study found that the incidence of non reactive tests was fourteen percent in the control group and nine percent in the study group. They also suggested that the use of auditory stimulation helped in reducing the false negative non stress tests by a half.

In another study by Clark and coworkers, it was found that the number of nonreactive tests decreased to two percent with the use of sound stimulation.[29]

Caroline Signore and co-workers in their study found that seventeen percent of non-stress tests were non-reactive even with sound stimulation. The overall intervention rate was 3 percent.[30]

Roger K Freeman and coworkers in their study found that the use of non-stress tests as primary surveillance had a three percent incidence of intervention because of abnormal test results while the contraction stress test group had four and a half percent incidence of intervention because of abnormal test results, which was statistically significant. Their study also stated that the non-stress test group had considerably higher number of cases with neonatal complications like respiratory distress syndrome, intrauterine growth retardation, low birth weight less than two and a half kilograms,5-minute APGAR scores less than seven .The antenatal death rate ratio was 1:8 for reactive to non-reactive non stress test which was statistically significant with a p values less than 0.005.[31]

Cito and co-workers in their study found that in three hundred sixty-eight low risk pregnancies that the position of the mother, mattered while doing non stress test-sitting or walking were better than recumbent position to reduce the false number of variable.[32]

Manning and co-workers,1980, in their study found that four variables with NST are accurate in assessing fetal health accuracy. [33]

Keegan and co-workers in their study found use of non-stress test as an out-patient procedure for screening at risk patients in the quickest way, was very useful. 634 pregnant females delivered within 1 week of an abnormal non stress test, seventeen of sixty two patients with non-reactive tests underwent Cesarean section for fetal distress as compared to eleven of the five hundred seventy-two pregnant females who had an reactive pattern.[34]

Evertson, Larry Rand co-workers in their study found that the uterine contractions is the most important stress factor which compromises the fetus to and provokes late decelerations in the fetus.[28]

Phelan JP and co-workers in the year 2000 in their study on evaluation of the non-stress tests chose nine hundred seventy-two high risk pregnant women. In their study, they found that in ninety four non stress tests there was fetal heart rate decelerations [nonreactive].In one hundred and ten cases accounting for 46.6percent of the total cases studied non stress tests was reactive.The non-stress test outcome was interpreted as reactive, in hundred and seventy eight cases and nonreactive in 58 cases, deceleration pattern, was found in 55.3 percent , this number was statistically extremely significant with a chi square p value less than 0.0001.[35]

Allan B. Weingold and coworkers in the year 1980,in their study found that with non-stress test there appears to be a higher chance of false positive result. Their study, also stated that in cases where the non-stress test showed a progressive loss of heart beat, baseline variability and declining rate of accelerations, all of which were considered ominous signs and these markers were reliable indicators of early signs of fetal compromise.[36]

Subrat Panda and coworkers, studied three hundred and fifty pregnant females who were 37 weeks or more period of gestation regarding fetal well being, by using the non-stress test for 20 minutes. They found that in those patients whose non stress test was nonreactive the outcome was adverse as they had a higher prevalence of various complications like fetal distress, meconium staining of the liquor and higher Caesarean section rates and perinatal morbidity .[37]

Anjana Verma and co-workers noted in their study that the rate of intervention in cases with non-reactive non stress test was 10:1.Perinatal morbidity was 4.8 percent in reactive non stress test, as compared to 55.92percent in non-reactive non stress test. They also found a sensitivity of 63.63 percent and specificity of the test was 93.33percent for the non-stress test.[38]

The rates of caesarean section in the study by Eden and co- workers in those who had a non reactive non stress test was 23.2percent.[39]

Shirin Niromanesh and co workers in the year 2017 in their study found that 12 percent of women had non-reactive non stress test and they had a higher incidence of intervention and perinatal morbidity.In the study, they also found a sensitivity of 76.9 percent and specificity of 97.3 percent for the non stress test.[40]

Subrat Panda and co-workers stated that non stress test had a sensitivity of 57.89 percent and a specificity of 96.30 percent in detecting the fetal distress and a positive predictive value of 8.57 percent and negative predictive value of 90.70 percent with a diagnostic accuracy of 89 percent. Among the cases with abnormal non stress test 21.42 percent had vaginal delivery and 78.57 percent required Lower Segment Caesarean Section to deliver the baby, the prevalence of meconium staining of the amniotic fluid was 85.71 percent.[37]

Kanan A.Yelikarand co-workers in their 2013 study compared non stress test against Doppler ultrasound. They concluded that both are useful investigative modalities in detecting the compromised status of the fetus ,low birth weight ,lower APGAR scores,and the need for neonatal intensive care admissions,but it was possible to detect the problems by Doppler 5.86 days earlier.[41]

Pravin Shrestha and co-workers in their study in the year 2015 on one hundred and twenty five pregnant mothers from 37 completed weeks to 42 weeks irrespective of risk factors were subjected to non-stress test for twenty minutes and this was extended to forty minutes in order to avoid fetal sleep cycle.They then categorized the patients based on the non-stress test findings into Category I,Category II and Category III according to NICHD. Fetal distress,meconium staining of the amniotic liquor was higher in Category III group.Of the total cases who needed LSCS 53 percent having fetal distress, of these 53 percent cases 85 percent had non stress test of Category II(37 percent)and Category III(48 percent).[42]

Bhattacharya and co-workers in their study in the year 1990 stated that when the non-stress test was non-reactive higher rates of complications occurred. 8 of the 13 neonatal deaths were seen in the non-reactive group, 13 of the 17 babies were found to be depressed at birth,were from the non-reactive group,10 of the 34 LSCS were from the non-reactive group.The mean sensitivity was 65.64 percent,mean positive predictive value was 23.12 percent, and mean false positive rate was 76.87 percent for the non-reactive test results.[43]

Begum MA and co-workers in their study in the year 2002 stated that a non stress test when reactive is a satisfactory indicator of fetal well-being and non reactive test shows fetal hazard in the form of significant increase in abnormal outcome of fetus, increases in low APGAR score, SGA infants, admission to NICU and perinatal mortality.[44]

Sharma Sushma and co-workers in their study in the year 2013 on 300 pregnant women-41 of whom had non-reactive non stress test accounting for 13.6

percent. 58.5percent cases from the non-reactive group delivered vaginally and in the reactive group it was above 90 % .The Caesarean section rate was 4.2 percent higher in those with non-reactive non stress test. Of the of 41 cases in the non-reactive group, 17 cases accounting for 41.4 percent required NICU admission.[45]

Abhijit Biswas and co-workers in their study in 2013 noted in the high-risk group,16.8 percent of whom had low APGAR score as compared to 5.2 percent in the control group.Out of14babies with low 5minutes APGAR score, 11had non-reactive test showing the sensitivity of78percent. Perinatal mortality incontrol group was 0,where as in high risk group ,it was 15percent.[46]

Devangi Munshi and coworkers in their study in 2013 stated that early registration, regular antenatal visitsand reactive non stress test reduced fetal morbidity, mortality and the need for NICU admission.[47]

P.Himabindu and coworkers in their study in 2015 stated that of all the cases evaluated, those with a non reactive non stress test[46 percent] underwent LSCS.[48]

Pravin Shrestha and co-workers in their study in the year 2015 stated that the outcome was unfavorable in those with non-reactive non stress test. [42]

J Rahman and co-workers in their study in the year 2015 stated that 38.7percent,53 cases had non-reactive non stress test and 98.11percent were delivered by caesarean .APGARscoringrevealedthat56.6percentof the newborn had depression and Caesarean section incidence was also increased. [49]

Sarita and co-workers in their study in the year 2015 stated that hypertension during pregnancy was the most common risk factor [33 percent],that had a non

reactive non stress test, preterm pregnancy had a non reactive non stress test in 42.86 percent .[50]

Ingemarsson and co workers in their study in the year 1986, found non stress test as a confirmatory tool for checking fetal well being it was extremely useful .[51]

Leveno K J and co-workers in their study in the year 1986,concluded that this form of monitoring changed the practice of obstetrics in many institutions without improving perinatal outcome.Unnecessary monitoring of low risk cases,improper evaluation of the graph, resulted in increased incidence of operative delivery.[52]

John Bourgeois and co-workers in their study found that in eight women four had reactive and four non reactive non stress tests.Two infants had growth restriction and two had abnormal cord positions with the non-stress test showing decelerations.[53]

R.Pazos and co-workers in their study found that the incidence of spontaneous fetal heart rate decelerations in the high-risk group was 5.5 percent and in them, there was an 18.2 percent mortality.[54]

MATERIALS AND METHODOLOGY

The study was a prospective non-randomized observational study that was done at the Obstetrics outpatient department, Sree Mookambika Institute of Medical Sciences, Kulasekharam, on pregnant women who fulfilled the inclusion and exclusion criteria

Study Design: Prospective study.

Study Participants: Pregnant women in the third trimester.

a. Inclusion Criteria:

- High-risk pregnant women with gestational age ≥ 32 weeks.
- Anaemia, Maternal Thyroid disorder, Diabetes, Renal disease, Chronic hypertension.
- Elderly primigravida (>30 years).
- Previous pre-eclampsia requiring delivery before 34 weeks' gestation, previous pre-eclampsia or gestational hypertension with delivery after 34 weeks'gestation.
- Previous spontaneous premature delivery.
- Previous low birth weight.
- Previous abruption, previous placenta previa.

- Previous LSCS.
- Previous stillbirth/early-neonatal death.
- Previous two miscarriage or induced abortion.
- H/o decreased fetal movements.
- Intrauterine growth restriction.
- Rh-isoimmunisation.

b. Exclusion criteria:

- Pre /post natal diagnosis of a fetal chromosomal or structural abnormality.
- Women with multiple gestation
- Women with uterine malformation.
- Women with gestational age < 32 weeks.

No. of Groups Studied: Two groups were studied.

The study participants:

Pregnant women attending Obstetrics and Gynaecology outpatient department, Sree Mookambika Institute of Medical Sciences, Kulasekharam, who fulfilled the inclusion and exclusion criteria, were selected. One group consisted of those women who were high-risk pregnancy. Second group/control group, consisted of women who were low risk.

Sampling:

1. Sample Size studied :- 46

2. Sample Size Calculation

$$\boldsymbol{N} = \frac{4PQ}{d^2}$$

P = non stress test reactive in vaginal mode of delivery = 68.57 percent (Dr. P. Himabindu et al [42)]

Q = 100-P = 100-68.57percent= 31.43 percent

d =20 percent of P =20 percent of 68.57percent= 13.71

d^2 = 188.01

Sample Size = 4 X 68.57 X 31.43 /188.01 = 45.85 = 46

c .Sampling Technique**:** Convenient sampling

Procedure:

Instrumentation

The basic guidelines for evaluating fetal well being is fetal heart rate and its variations.

Fetal heart rate monitor is a device with two components

- To recognize and process the heart rate
- To identify uterine contraction

i) Doppler ultrasound transducer

A multi crystal, wide-angle ultrasound transducer used for monitoring the fetal heart rate. It is affixed to maternal abdominal wall at the site where heart sound, it transmits a high frequency ultrasound approx. 2 MHz. The signal is reflected from a moving structure i.e. ventricular wall and reflected beam is changed in frequency. This change in frequency with each systole is recognized as a cardiac event and is processed by machine.

ii) Tocodynamometer

External device that is strapped to the maternal abdominal wall generally over the fundus for assessing the timing, duration and relative strength of contraction.

iii) Event marker

Its purpose is to mark fetal movement.

iv) Graphic recording

The whole event was depicted over screen and is graphed over a specialized paper by printer for permanent record.

Non stress test is conducted after 32 weeks of gestation.

- The gestational age calculated based on the LMP/regularity of cycles & dating USG.

- Non stress test repeated depending upon the result, indication, gestational age, risk factor, financial condition and compliance for follow up.

- Non stress test conducted for a maximum time of 20 minutes.

- If acceleration in this period was insufficient,fetus stimulated manually or process repeated after 1-2hrs /after meals.

- If the test was non-reactive, test considered as positive test and if the test comes reactive,test considered as negative.

Data Collection Methods including Setting and Periodicity:-

Pregnant women attending Obstetrics and Gynaecology outpatient department, Sree Mookambika Institute of Medical Sciences, Kulasekharam, who fulfilled the inclusion and exclusion criteria,were considered for the study.

- Ninety two women were included in the study with 46 high risk cases and 46 in the control group. Patients selected were both emergency and registered patients attending the hospital for a period of one year.

- Identifying the risk factor.

- Procedure for the test was explained to the patient. A detailed history was taken which included the patient's education, occupation, socio-economic status, menstrual history, obstetric history; previous obstetrical events were asked in detail, past medical and surgical history and personal history.

- Symptoms suggesting presence of above-mentioned complications –example: oedema, headache, oliguria, giddiness, vision problem, decreased fetal movements were noted.

- A thorough general physical examination and obstetrical examination was done.

- Specific proforma was designed and used.

- Vitals signs and all systems were examined.

- Investigations -All preliminary investigations including Non Stress Test & USG done ,along with follow up until their delivery.

- Patient undergo USG, which if normal,they are allowed to go home and review after one week. If USG surveillance indicated problems,admission and then intervention was indicated.

- Neonatal outcome, gestational age at delivery and postpartum complications, birth weight and APGAR score of the baby were noted.

- Pregnancy outcomes between the two groups were compared.

RESULTS

Maternal Parameters

Age

The distribution of age in the high risk group ranges from 18 to 39 years. The mean age of study participants was 28.63 years and a SD of 4.841 years.The distribution of age in the low risk group ranges from 20 to 30 years. The mean age of study participants was 24.20 years and a SD of 3.088 years.

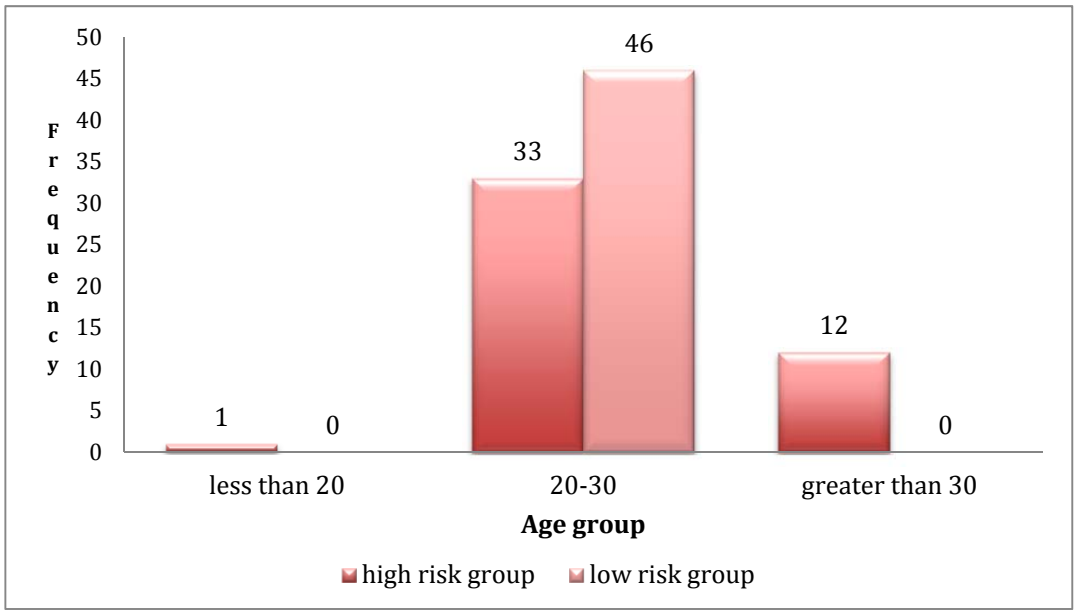
Table-1. Distribution according to age of participants in low risk and high risk group

Age characteristics (years)	High risk group (N=46)	Low risk group (N=46)
Minimum	18	20
Maximum	39	30
Mean	28.63	24.20
Standard deviation	4.841	3.088

Table-2.Distribution according to age group of participants in low risk and high risk group

Age group	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Less than 20	1	2.2	0	0
20-30	33	71.7	46	100
Greater than 30	12	26.1	0	0
Total	46	100	46	100

Graph-1 Distribution of age in high risk group and low risk group



Gestational age

The distribution of gestational age in the high risk group ranges from 251 to 284days. The mean gestational age of study participants was 267 days and a SD of 6 days

The distribution of gestational age in the low risk group ranges from 257 to 282 days. The mean age of study participants was 268 days and a SD of 4 days.

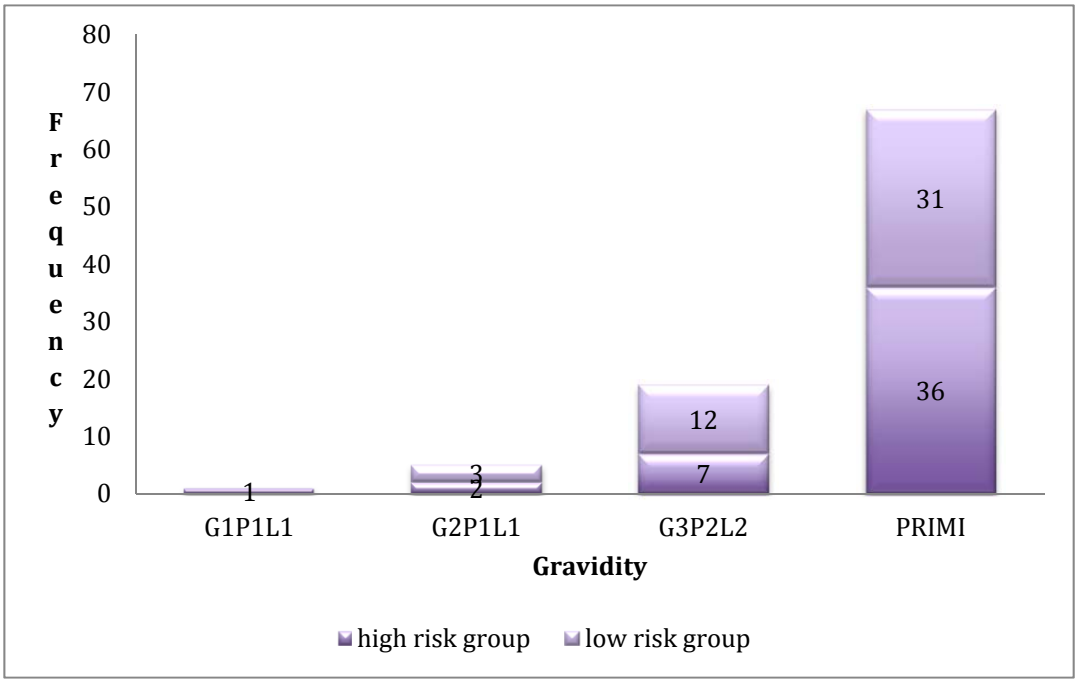
Table- 3: Distribution according to gestational age at examination

Gestational age (days)	High risk group (N=46)	Low risk group (N=46)
Minimum	251	257
Maximum	284	282
Mean	267	268
Standard deviation	6	4

Table-4 : Gravidity

Gravidity	High risk group		Low risk group	
	Frequency	**Percentage**	**Frequency**	**Percentage**
G1P1L1	1	2.2	0	0
G2P1L1	2	4.3	3	6.5
G3P2L2	7	15.2	12	26.1
PRIMI	36	78.3	31	67.4
Total	46	100	46	100

Graph- 2 : Distribution of gravidity in high risk group and low risk group



RISK

Table-5 : Distribution of risk in high risk group

Risk	Frequency	Percentage
Abruption placenta	1	2.2
Anemia	2	4.3
Elderly Primi	16	34.8
GDM	8	17.4
Gestatinal hypertension	2	4.3
IUGR	2	4.3
IUI	1	2.2
IVF	4	8.7
Placenta previa	1	2.2
Pre eclampsia	5	10.9
Previous LSCS	2	4.3
Teenage pregnancy	1	2.2
Thyroid in pregnancy	1	2.2
Total	46	100.0

Graph- 3 : Distribution of risk factors

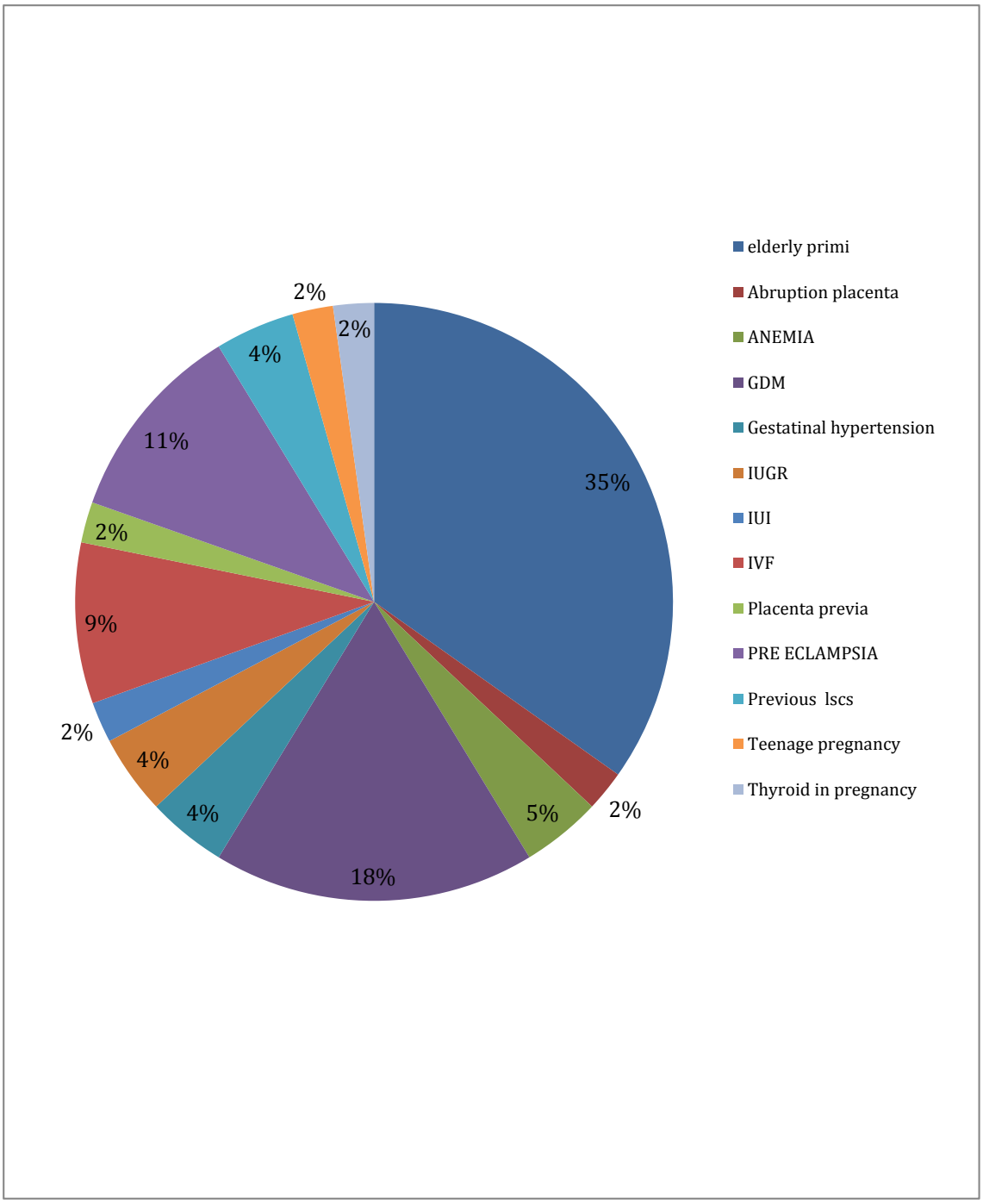
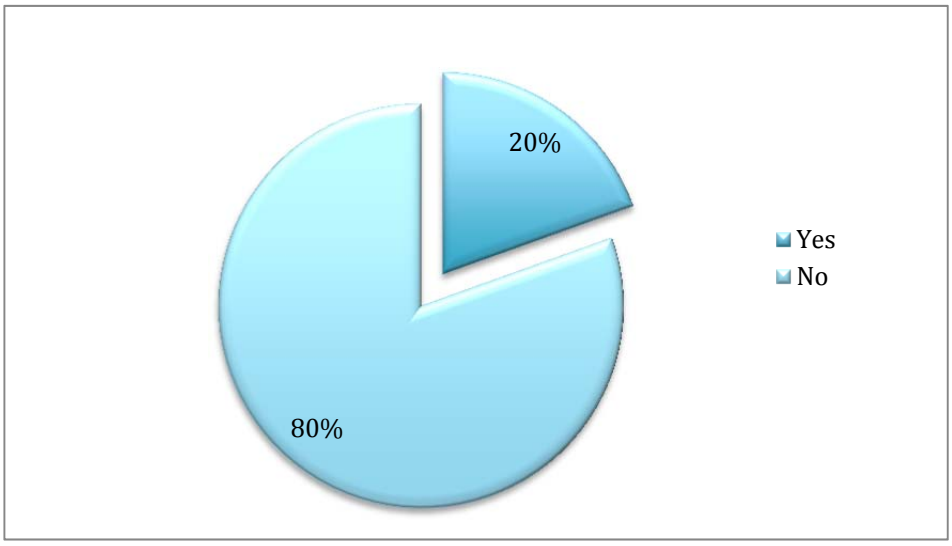


Table-6 : Intrapartum fetal distress

Intrapartum fetal distress	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Yes	9	19.5	4	8.6
No	37	80.4	42	91.3
Total	46	100	46	100

Graph- 4 : Distribution of intrapartum fetal distress in high risk group



Graph- 5 : Distribution of intrapartum fetal distress in low risk group

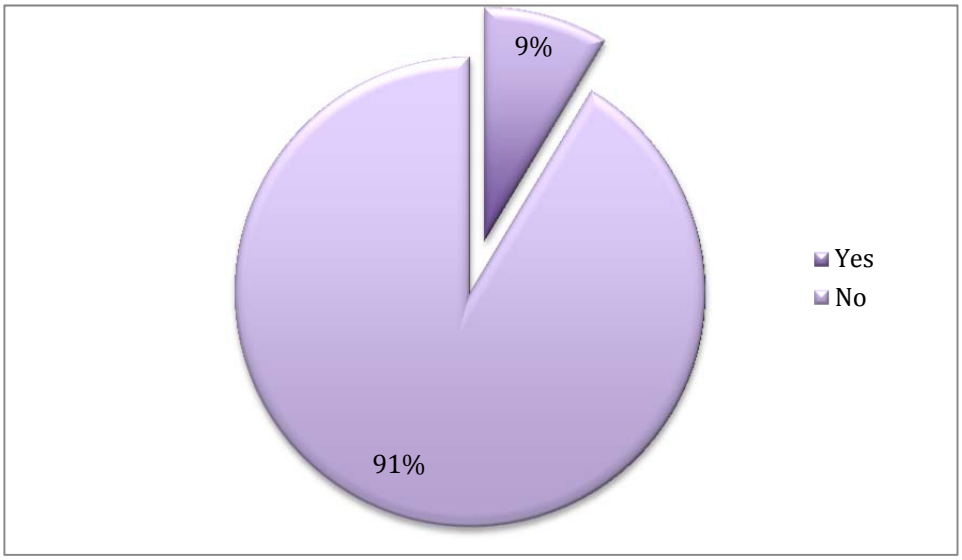


Table-7 : Meconium stained

Meconium stained	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Yes	4	8.7	6	13
No	42	91.3	40	87
Total	46	100	46	100

Graph- 6 : Distribution of meconium stained in high risk group and low risk group

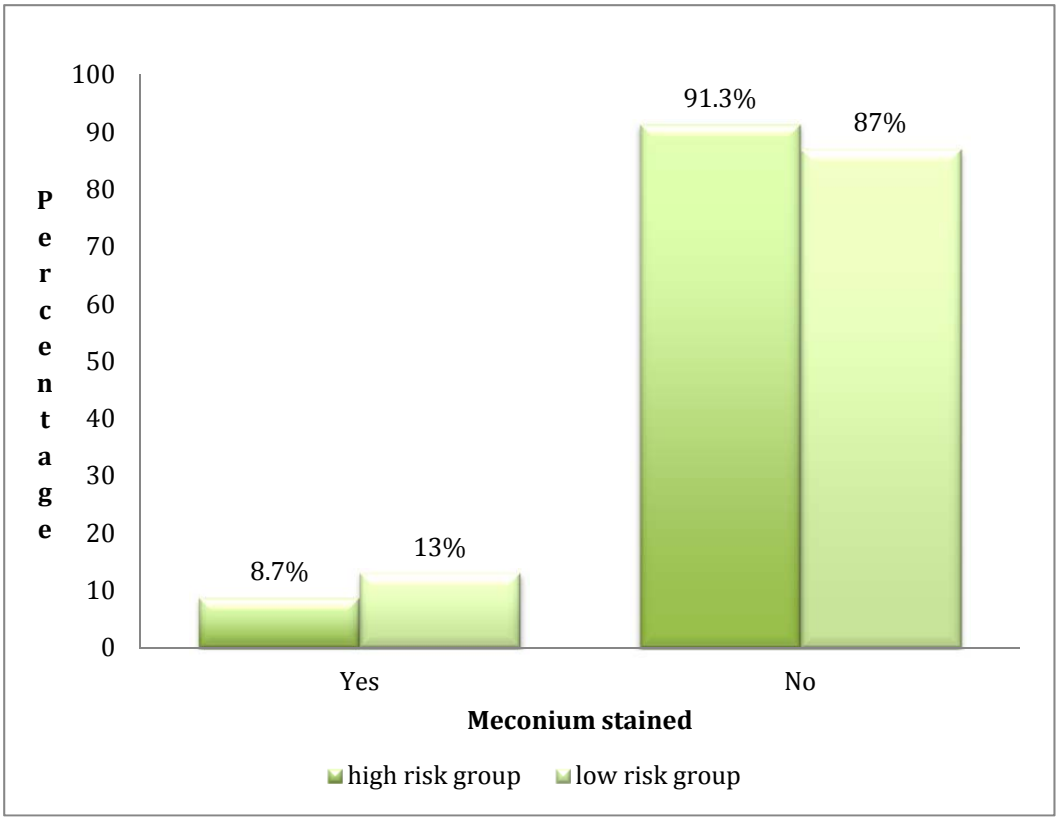
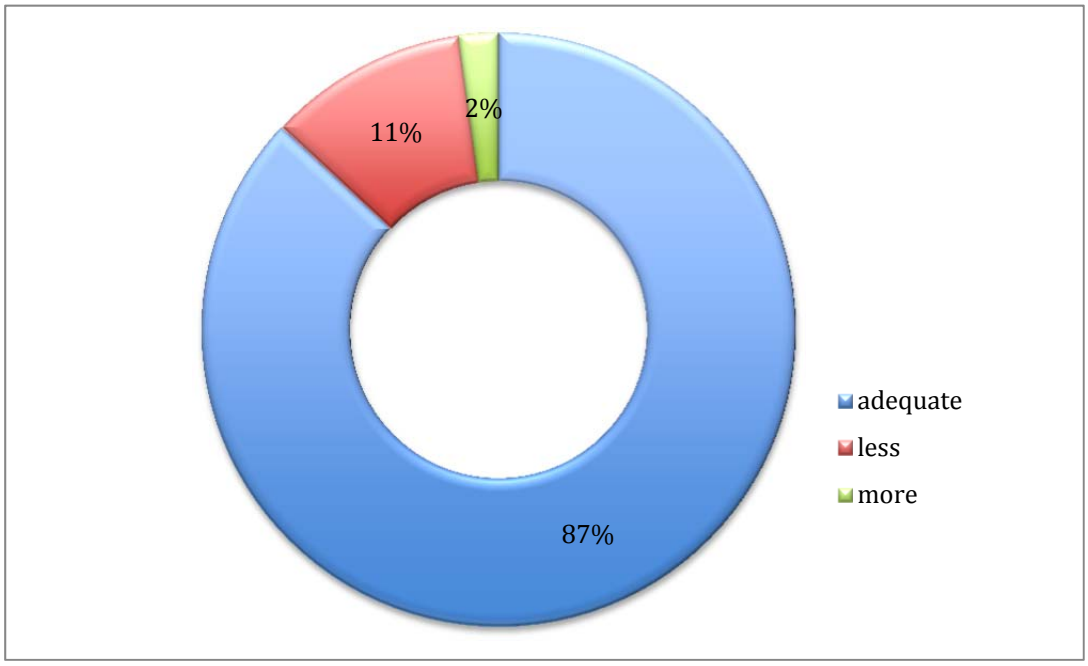


Table- 8 : Quantity of liquor

Quantity of liquor	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Adequate	40	87	43	93.5
Less	5	10.9	3	6.5
More	1	2.2	0	0
Total	46	100	46	100

Graph- 7 : Distribution of quantity of liquor in high risk group



Graph- 7 : Distribution of quantity of liquor in low risk group

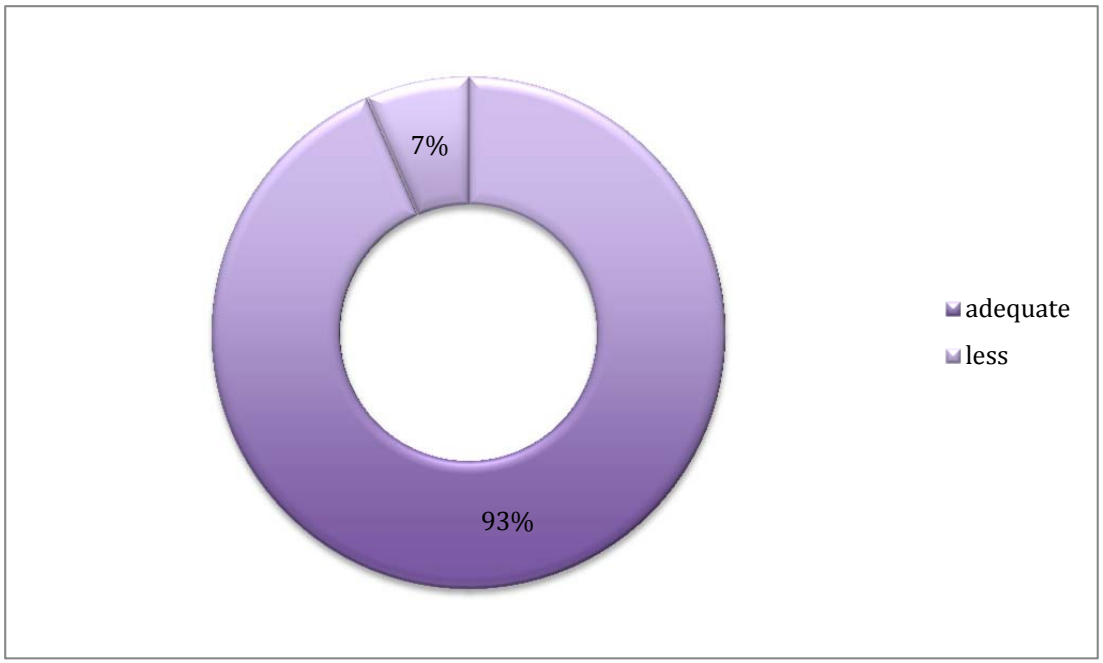


Table- 9 : Mode of delivery

Mode of delivery	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
LSCS	22	47.8	8	8.7
VD	24	52.2	38	91.3
Total	46	100	46	100

Graph- 8 : Distribution according to mode of delivery in high risk and low risk group

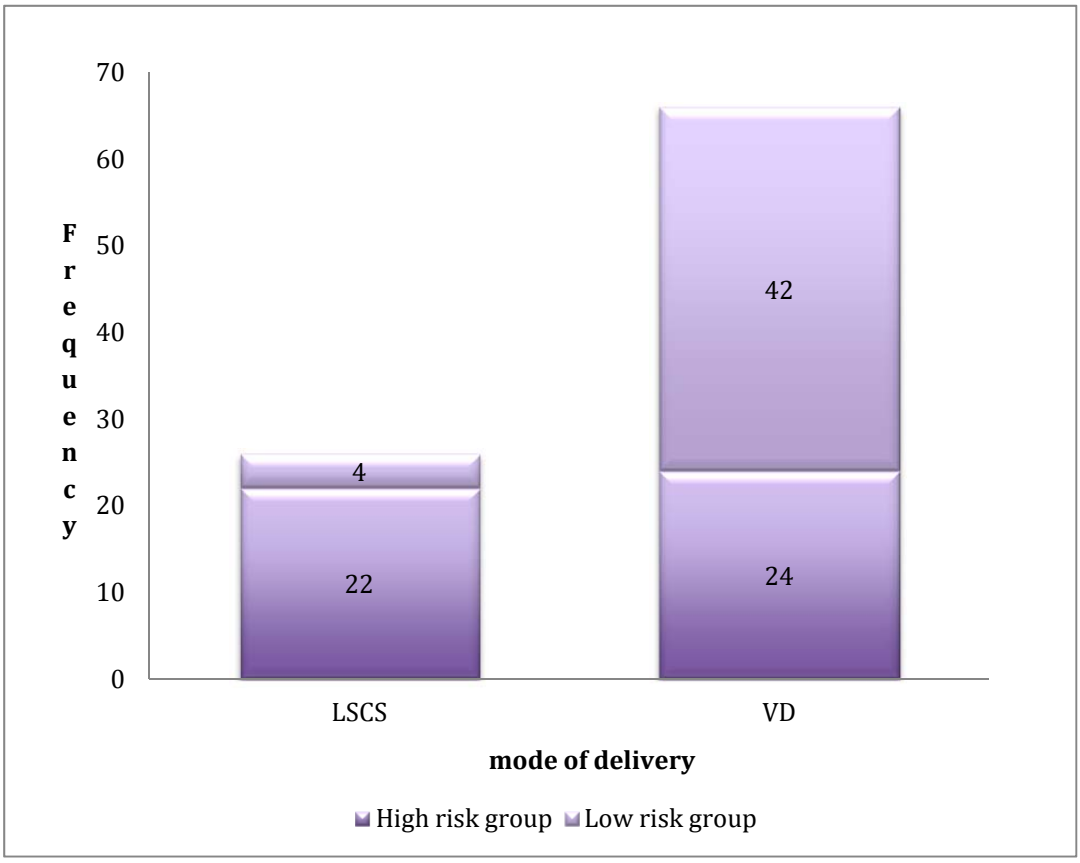
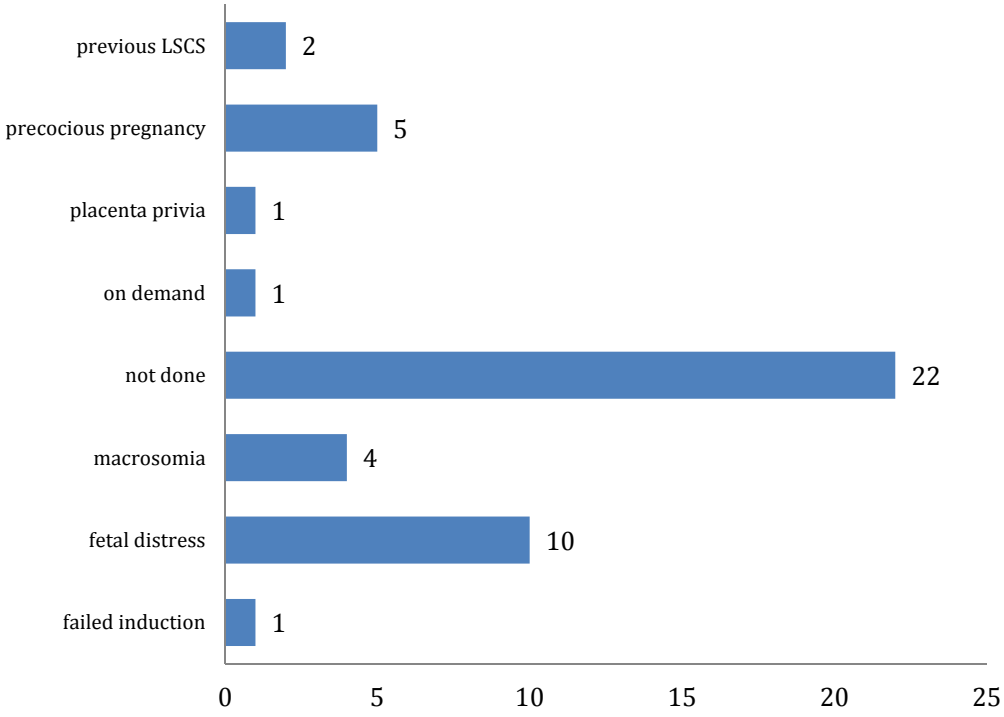


Table- 10 : LSCS indication

LSCS indication	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Failed induction	1	2.2	2	4.3
Fetal distress	10	21.7	3	6.5
MACROSOMIA	4	8.7	0	0
On demand	1	2.2	0	0
Placenta previa	1	2.2	0	0
Precocious pregnancy	5	10.9	0	0
Previous LSCS	2	4.3	3	6.5
Total	46	100	46	100

Graph- 9: LSCS indication in high risk group



Graph- 10 : LSCS indication in low risk group

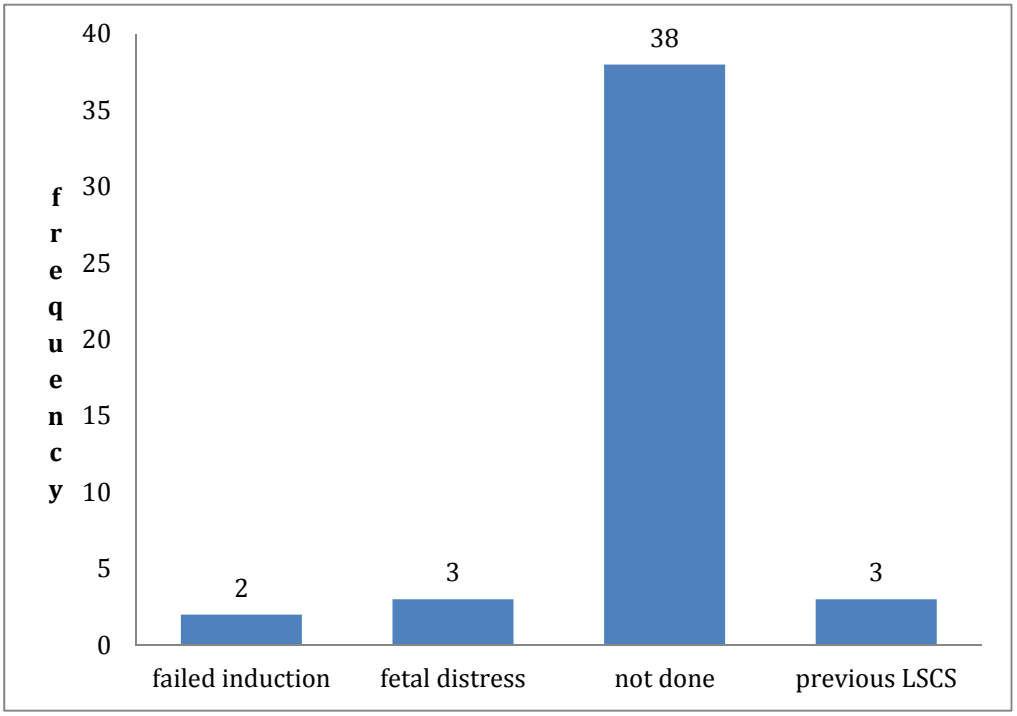
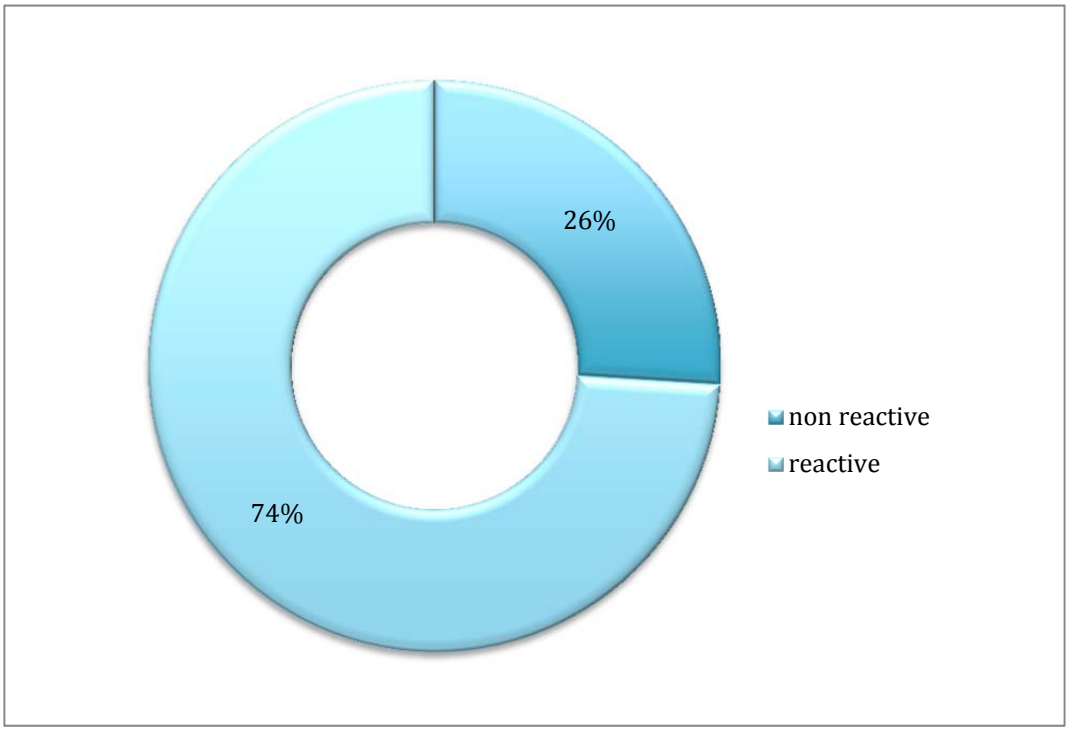


Table- 11 : Non stress test

Non stress test	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Non reactive	12	26	9	19.6
Reactive	34	74	37	80.4
Total	46	100	46	100

Graph- 11 : Distribution according to non stress test in high risk group



Graph- 12 : Distribution according to non stress test in low risk group

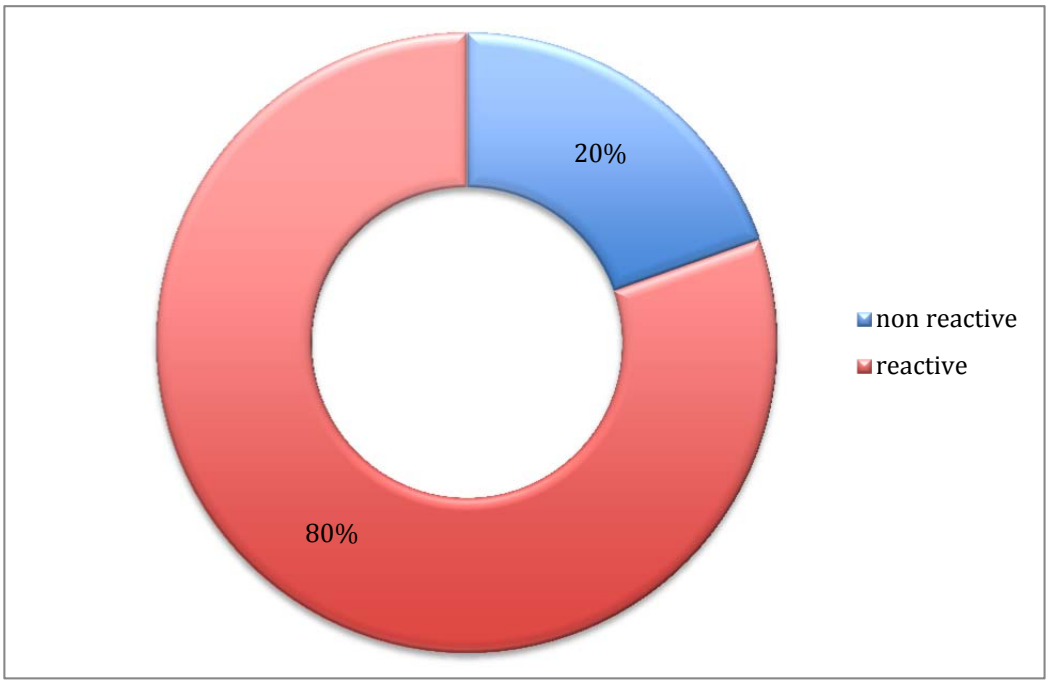


Table- 12 : Induction

Induction	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Induced	17	37	20	43.5
Not induced	29	63	26	56.5
Total	46	100	46	100

Graph- 13 : Distribution according to induction in high risk and low risk group

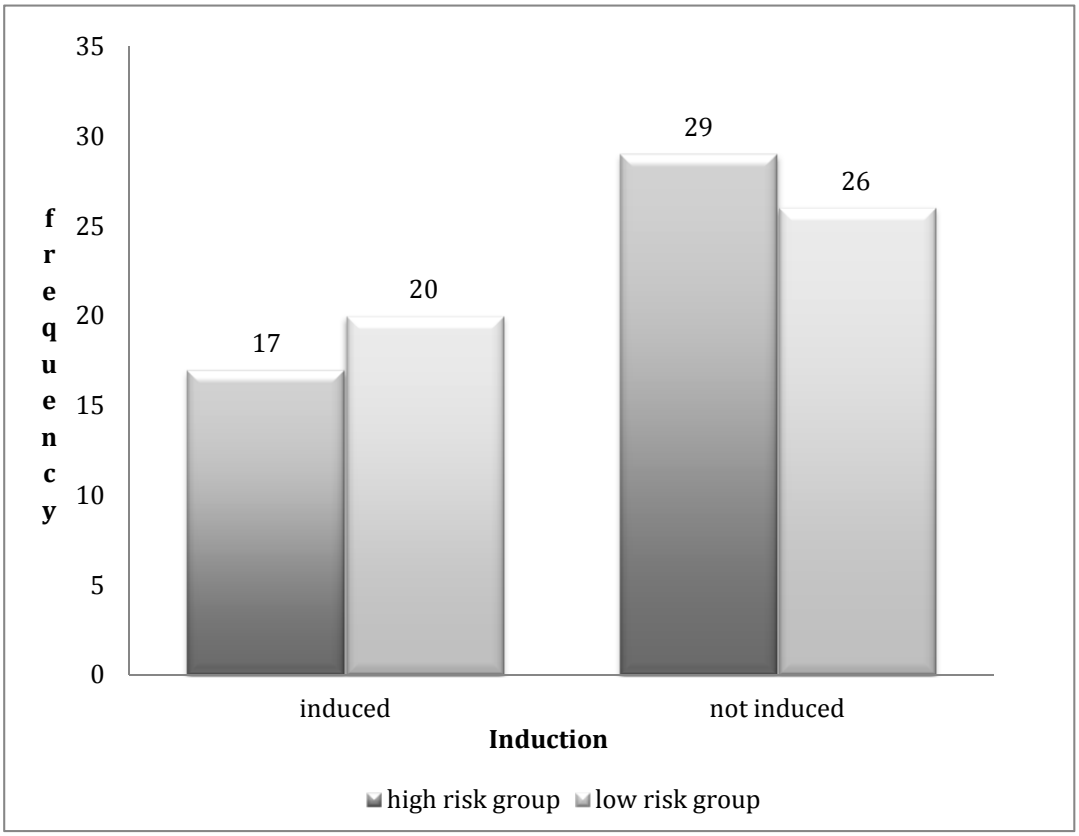


Table- 13 : APGAR at 5 min.

APGAR at 5 min	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
5	2	4.3	2	4.3
6	2	4.3	0	0
7	4	8.7	6	13
8	8	17.4	7	15.2
9	30	65.2	31	67.4
Total	46	100	46	100

Graph- 14 : Distribution according to APGAR at 5 min. in high risk and low risk group

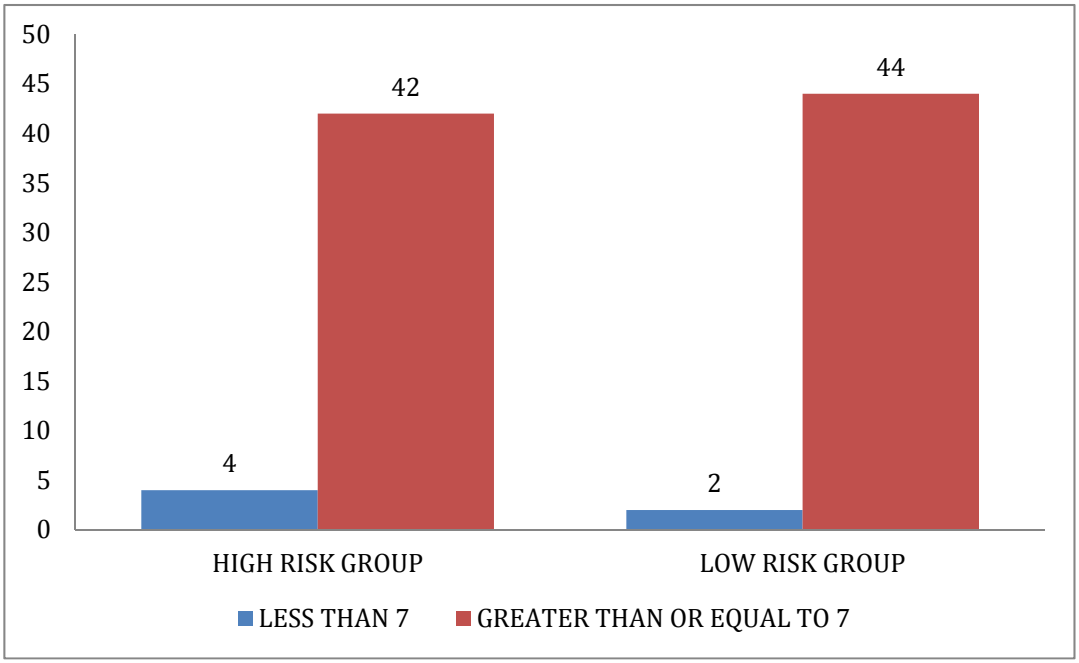


Table- 14 : Appropriate for gestational age

	High risk group		Low risk group	
	Frequency	**Percentage**	**Frequency**	**Percentage**
AGA	32	69.6	42	91.3
LGA	4	8.7	0	0
SGA	10	21.7	4	8.7
Total	46	100	46	100

Graph- 15 : Distribution according to appropriate for gestational age in high risk and low risk group

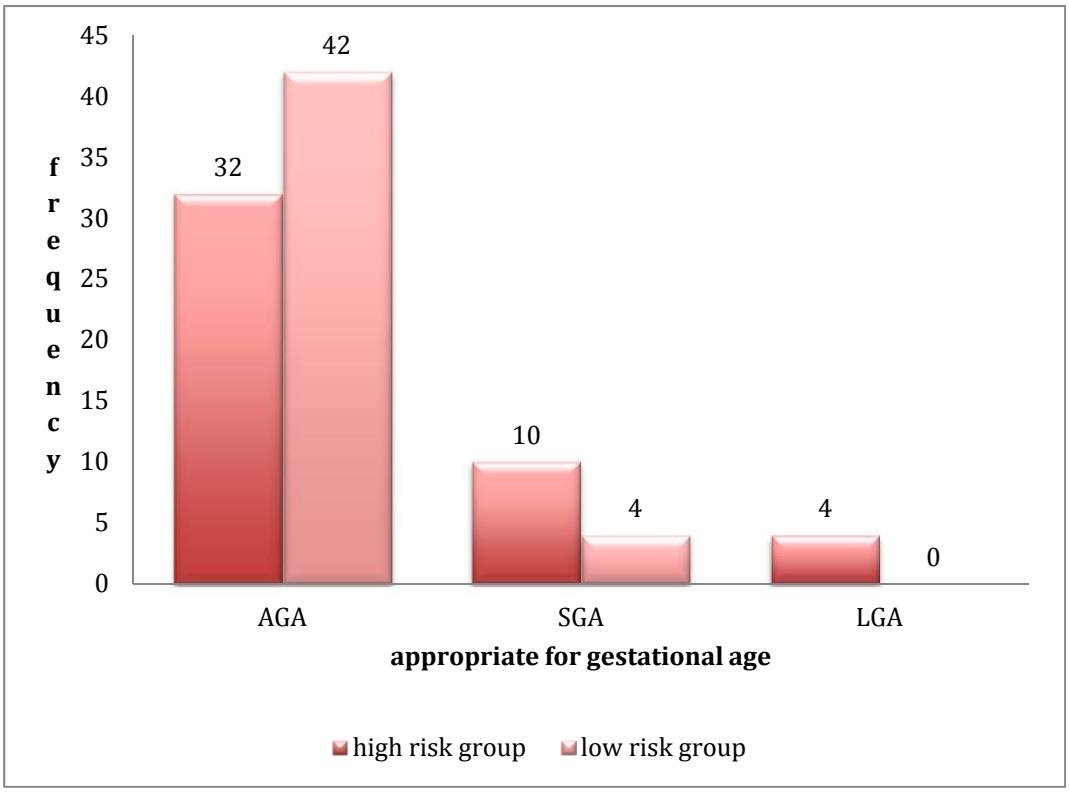


Table- 15 : TERM

TERM	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
POSTTERM	1	2.2	2	4.4
PRETERM	1	2.2	1	2.2
TERM	44	95.7	43	93.4
Total	46	100	46	100

Graph- 16 : Distribution according to term in high risk and low risk group

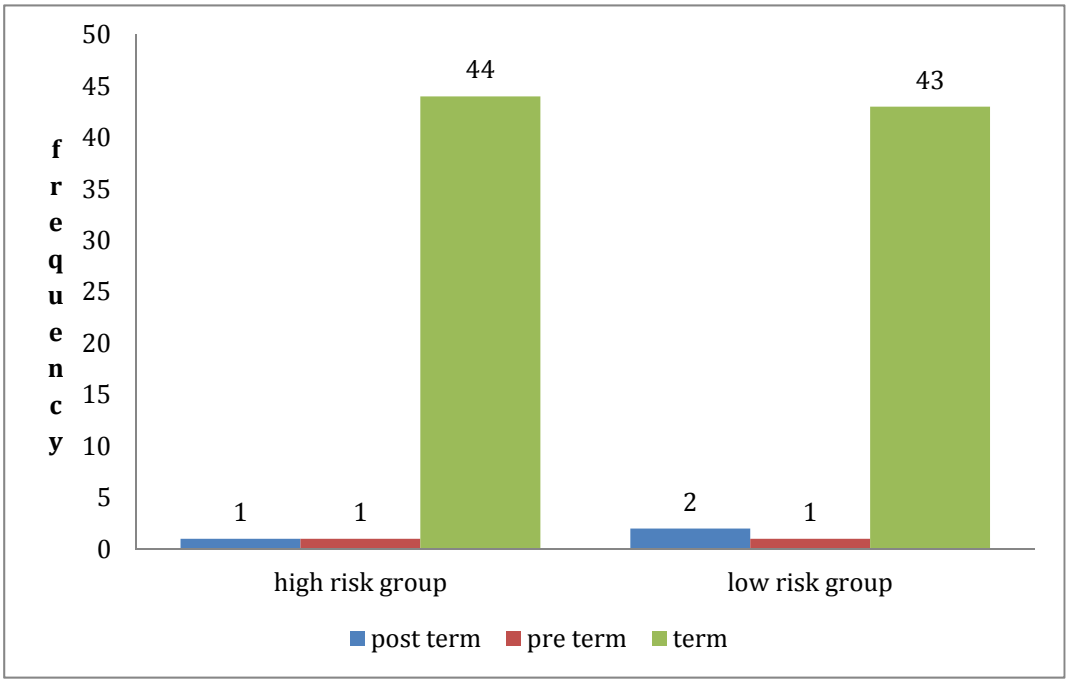


Table- 16 : BOOKING

Booking	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Booked	44	95.6	43	93.5
Unbooked	2	4.4	3	6.5
Total	46	100	46	100

Graph- 17 : Distribution of booked and unbooked cases in both groups

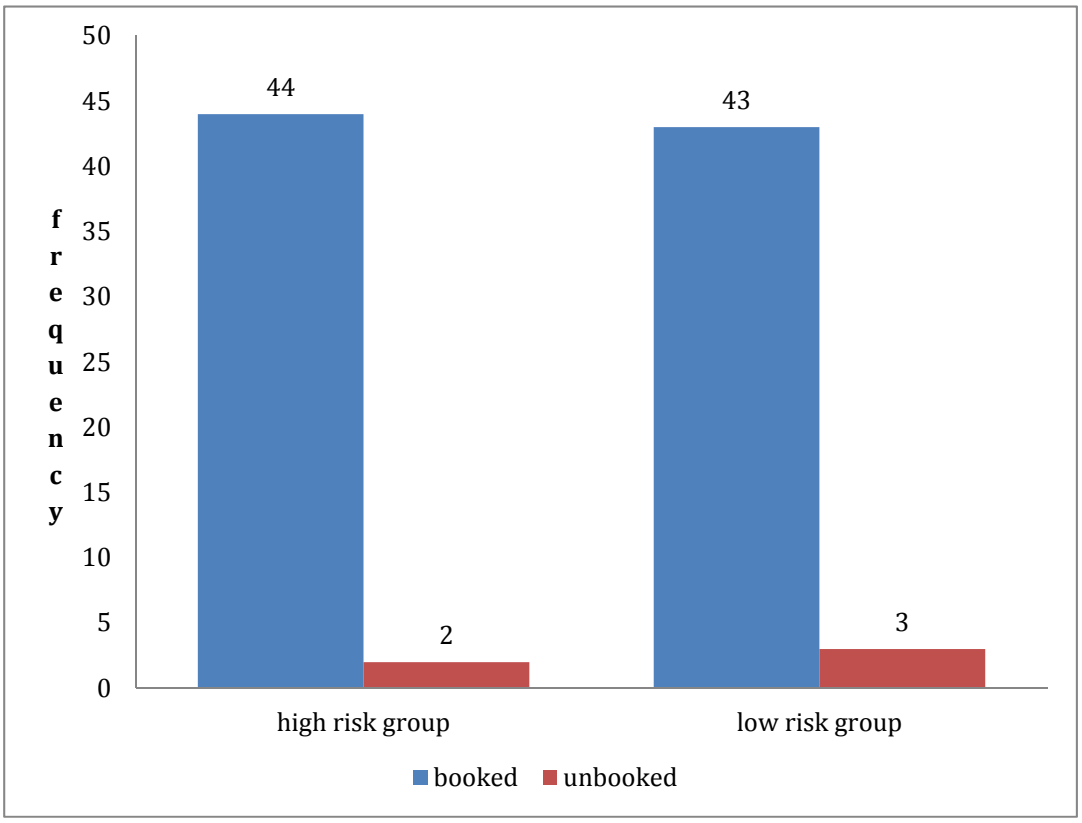
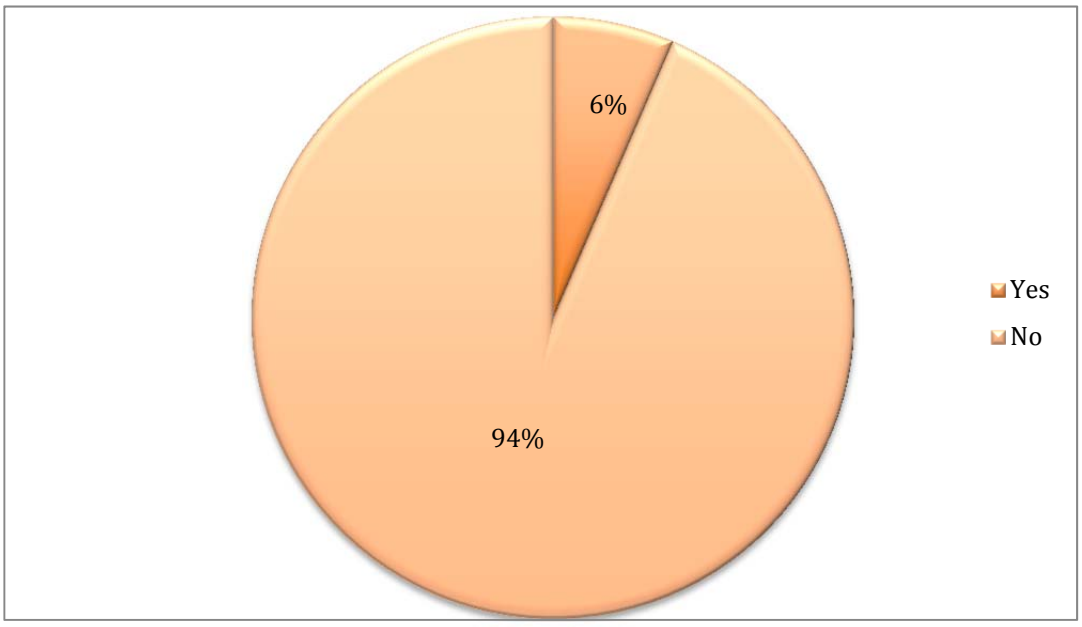


Table- 17: Infertility treated

Infertility treated	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Yes	3	6.5	1	2.2
No	43	93.5	45	97.8
Total	46	100	46	100

Graph- 18 : Distribution according to infertility in high risk group



Graph- 19: Distribution according to infertility in low risk group

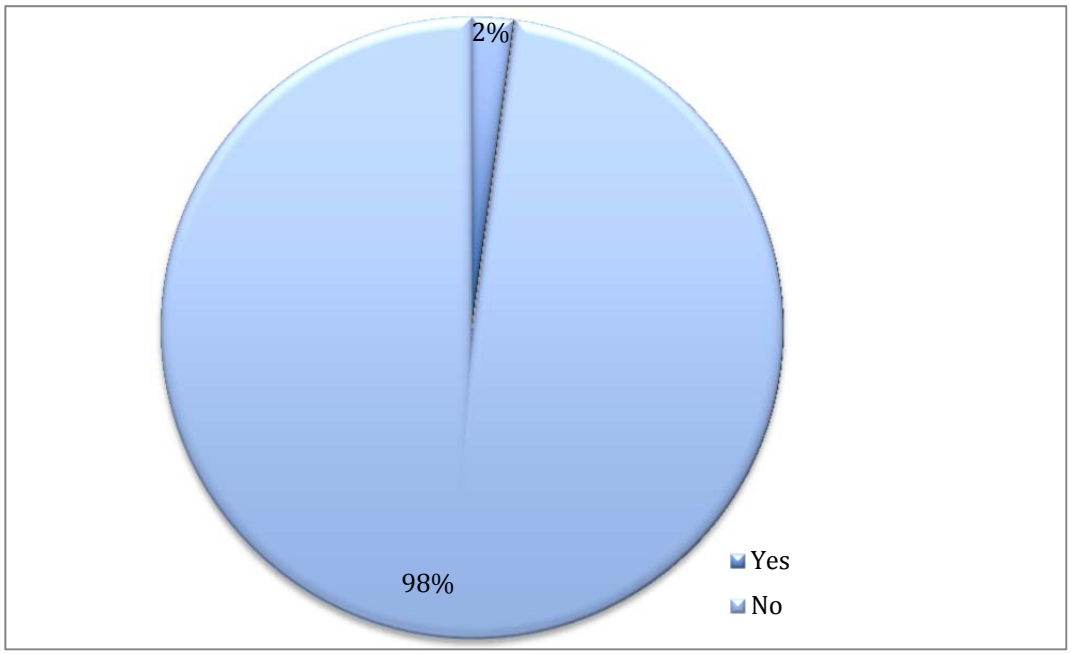


Table- 18 : NICU admission

NICU admission	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Yes	9	19.6	5	10.8
No	37	80.4	41	89.2
Total	46	100	46	100

Graph- 20 : Distribution according to NICU admission in high risk and low risk group

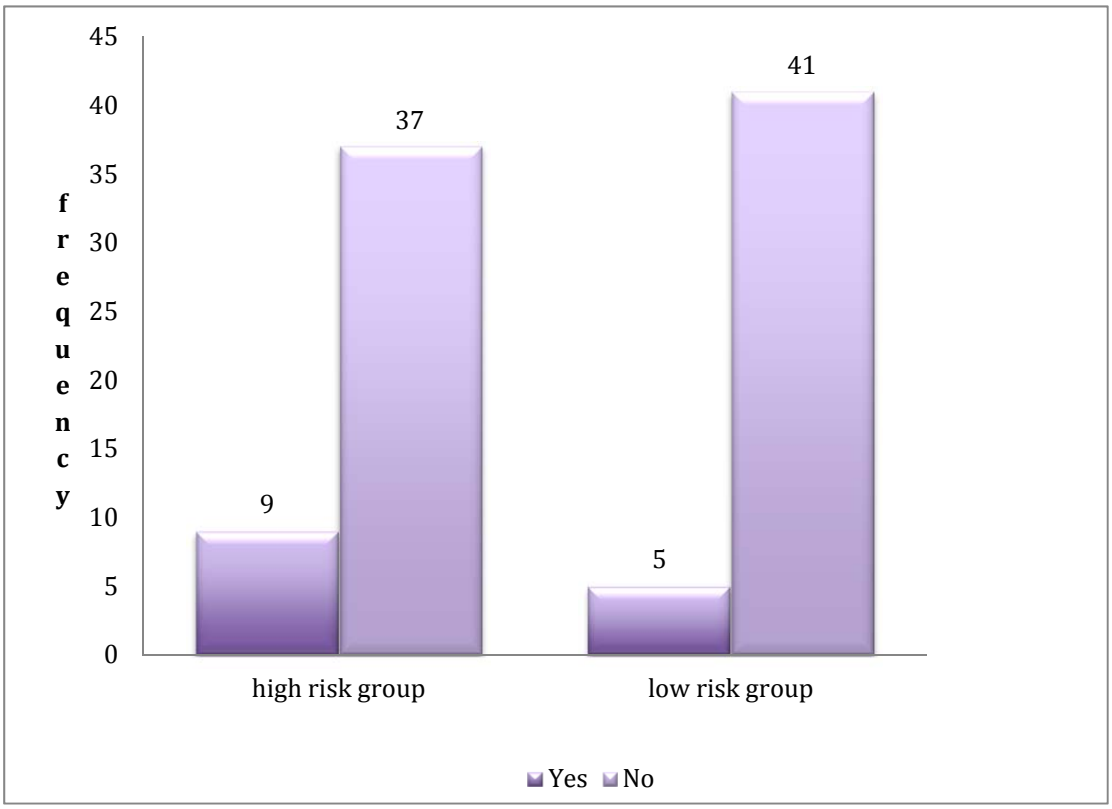
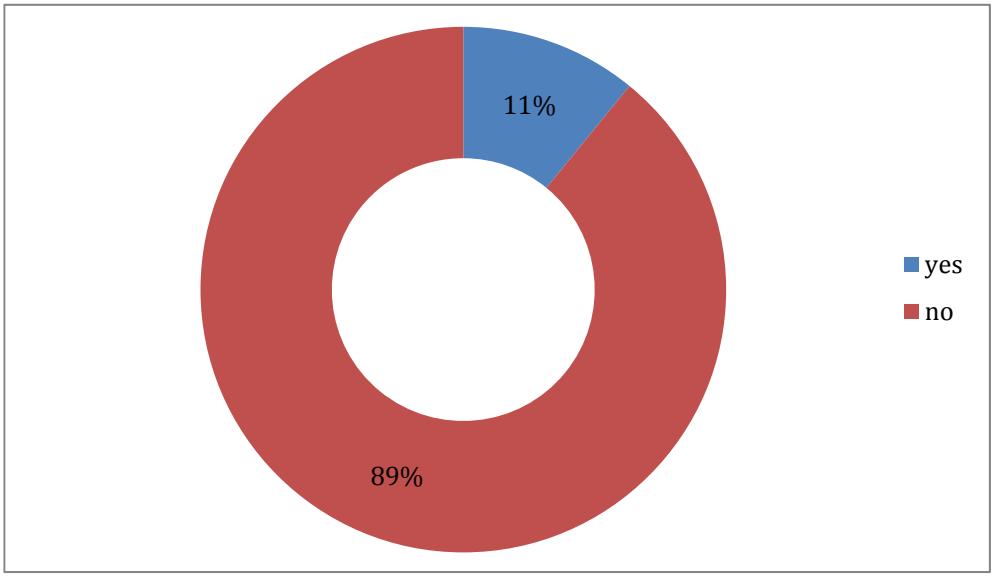


Table- 19 : Neonatal complications

Neonatal complication	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Yes	5	10.9	3	6.5
No	41	89.1	43	93.5
Total	46	100	46	100

Graph- 21 : Distribution according to neonatal complications in high risk group



Graph- 22 : Distribution according to neonatal complications in low risk group

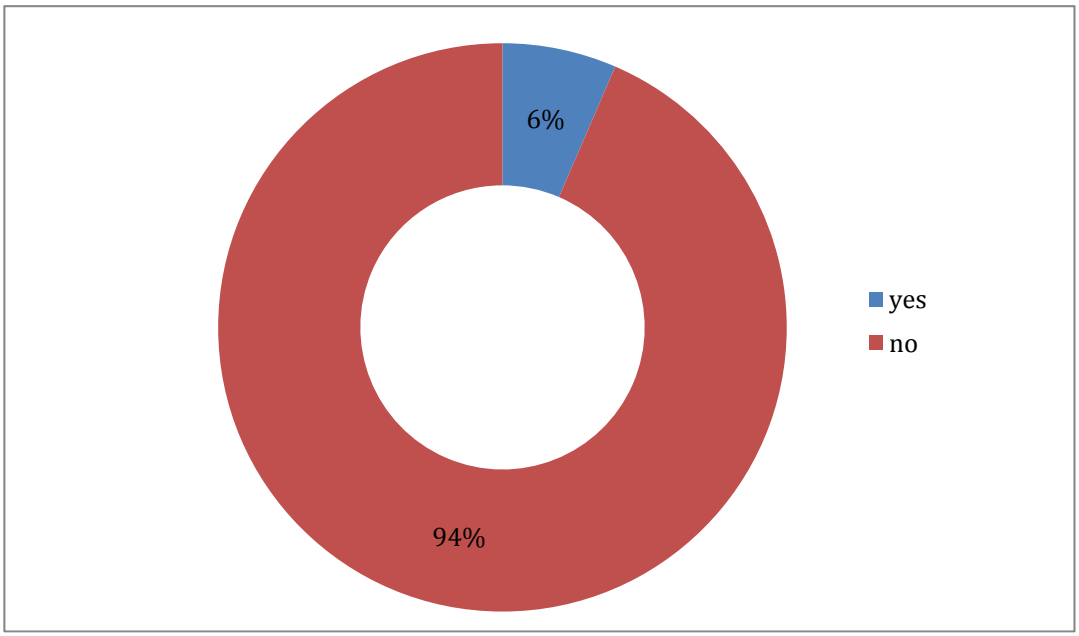


Table- 20 : Live/still birth

	High risk group		Low risk group	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Live birth	43	93.5	45	97.8
Still birth	3	6.5	1	2.2
Total	46	100	46	100

Graph- 23 : Distribution according to live/still birth in high and low risk group

Neonatal parameters

Foot length

The distribution of foot length in the high risk group ranges from 6.7 to 8.3 cm. The mean foot length of study participants was7.69cm and a SD of 0.34 cm

The distribution of foot length in the low risk group ranges from 6.5 to 8.3 cm. The mean foot length of study participants was 7.63 cm and a SD of 0.38cm.

Table- 21 : Distribution according to foot length

Foot length (cm)	High risk group (N=46)	Low risk group (N=46)
Minimum	6.7	6.5
Maximum	8.3	8.3
Mean	7.69	7.63
Standard deviation	0.34	0.38

Head circumference

The distribution of head circumference in the high risk group ranges from 31.5 to 49.2 cm. The mean head circumference of study participants was36.57cm and a SD of 6.46 cm

The distribution of head circumference in the low risk group ranges from 31.5 to 49.2 cm. The mean head circumference of study participants was 36.578 cm and a SD of 6.468cm.

Table- 22 : Distribution according head circumference

Head circumference(cm)	High risk group (N=46)	Low risk group (N=46)
Minimum	31.5	31.5
Maximum	49.2	49.2
Mean	36.57	36.578
Standard deviation	6.46	6.468

Crown heel length

The distribution of crown heel length in the high risk group ranges from 32.8 to 50 cm. The mean crown heel lengthof study participants was45.05cm and a SD of 6.38 cm

The distribution of crown heel length in the low risk group ranges from 32.8 to 50 cm. The mean crown heel length of study participants was 45.05 cm and a SD of 6.38cm.

Table- 23 : Distribution according to crown heel length

crown heel length (cm)	High risk group (N=46)	Low risk group (N=46)
Minimum	32.8	32.8
Maximum	50	50
Mean	45.05	45.05
Standard deviation	6.38	6.38

Birth weight

The distribution of birth weight in the high risk group ranges from 2 to 4 kg. The mean birth weight of study participants was2.75 kg and a SD of 0.518 kg

The distribution of birth weight in the low risk group ranges from 2 to 3.6 kg. The mean birth weight of study participants was 2.71 kg and a SD of 0.334 kg.

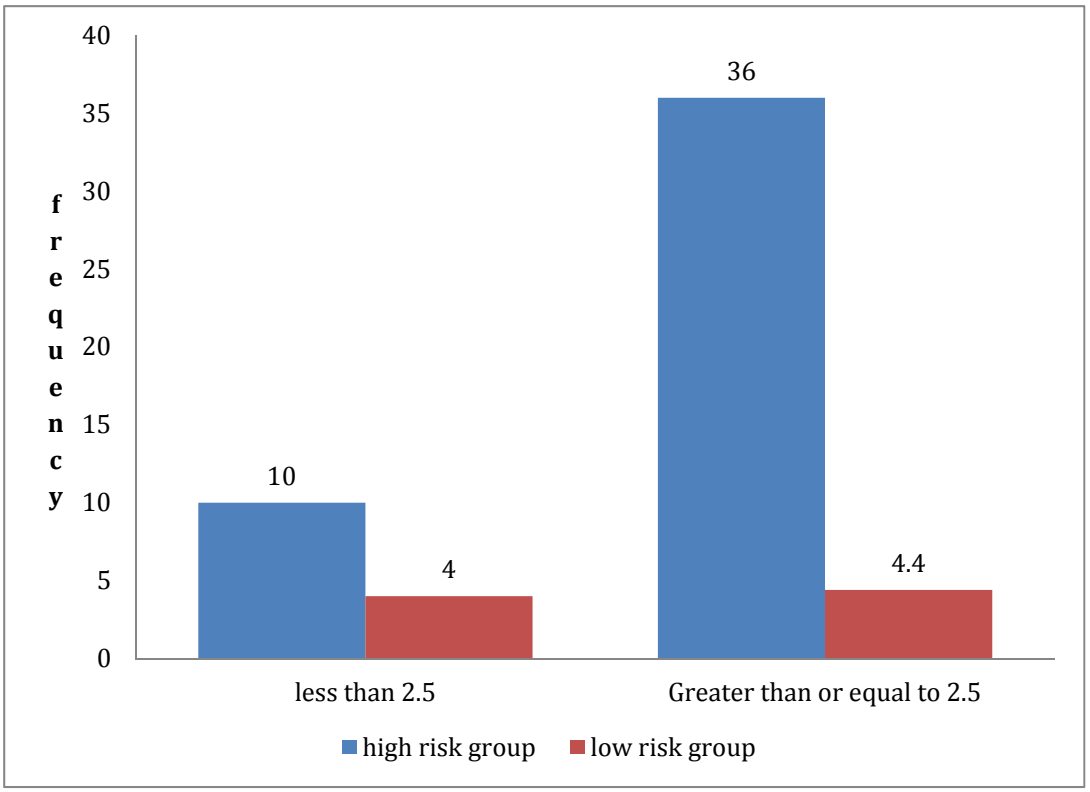
Table- 24 : Distribution according to birth weight

birth weight(kg)	High risk group (N=46)	Low risk group (N=46)
Minimum	2	2
Maximum	4	3.6
Mean	2.75	2.71
Standard deviation	0.518	0.334

Table- 25 : Distribution according to birth weight of neonates <2.5 kg

Birth weight	High risk group		Low risk group	
	Frequency	Percentage	Frequency	Percentage
Less than 2.5	10	21.7	4	8.7
Greater than or equal to 2.5	36	78.3	42	91.3
Total	46	100	46	100

Graph- 24 : Distribution according to birth weight of neonates in high risk and low risk group



Comparison of association between non stress test and perinatal outcomes in high risk and low risk group

Non stress test with mode of delivery

In this study it is found that non stress test have no statistically significant association with mode of delivery in high risk group and low risk group (p>0.05).

Table- 26 : Non stress test with mode of delivery in high risk group

Non stress test	Mode of delivery		Total
	LSCS N (%)	VD N (%)	
Non reactive	7 (58.3)	5 (41.7)	12
Reactive	15 (44.1)	19 (55.9)	34
Total	22	24	46

$\chi^2 = 0.718$ df=1 p=0.397

Table- 27 : Non stress test with mode of delivery in low risk group

Non stress test	Mode of delivery		Total
	LSCS N (%)	VD N (%)	
Non reactive	2 (22.2)	7 (77.8)	9
Reactive	2 (5.4)	35 (94.6)	37
Total	4	42	46

p=0.167

Non stress test with appropriate for gestational age

In this study it is found that non stress test have no statistically significant association with appropriate for gestational age in high risk group and low risk group (p>0.05).

Table- 28 : Non stress test with appropriate for gestational age in high risk group

Non stress test	Appropriate for gestational age			Total
	AGA N (%)	LGA N (%)	SGA N (%)	
Non reactive	8 (66.7)	0 (0)	4 (33.3)	12
Reactive	24 (70.6)	4 (11.8)	6 (17.6)	34
Total	32	4	10	46

$\chi^2 = 2.435$ df=2 p=0.296

Table- 29 : Non stress test with appropriate for gestational age in low risk group

Non stress test	Appropriate for gestational age		Total
	AGA N (%)	SGA N (%)	
Non reactive	8 (88.9)	1 (11.1)	9
Reactive	34 (91.9)	3 (8.1)	37
Total	42	4	46

p=1

Non stress test with live/still birth

In this study it is found that non stress test have statistically significant association with live/still birth in high risk group ($p<0.05$) and no statistically significant association in low risk group ($p>0.05$).

Table- 30 : Non stress test with live/still birth in high risk group

Non stress test	Live/still birth		Total
	Live birth N (%)	Still birth N (%)	
Non reactive	9 (75)	3 (25)	12
Reactive	34 (100)	0 (0)	34
Total	43	3	46

$p=0.014^{*}$

Table- 31 : Non stress test with live/still birth in low risk group

Non stress test	Live/still birth		Total
	Live birth N (%)	Still birth N (%)	
Non reactive	8 (88.1)	1 (11.9)	9
Reactive	37 (100)	0 (0)	34
Total	45	1	46

$p=0.196$

Non stress test with term

In this study it is found that non stress test have no statistically significant association with term in high risk group and low risk group (p>0.05).

Table- 32 : Non stress test with term in high risk group

Non stress test	Term			Total
	Post term N (%)	Pre term N (%)	Term N (%)	
Non reactive	0 (0)	0 (0)	12 (100)	12
Reactive	1 (2.9)	1 (2.9)	32 (94.1)	34
Total	1	1	44	46

χ^2 = 0.738 df=2 p=0.691

Table- 33 : Non stress test with term in low risk group

Non stress test	Term			Total
	Post term N (%)	Pre term N (%)	Term N (%)	
Non reactive	1 (11.1)	0 (0)	8 (88.9)	9
Reactive	1 (2.97	1 (2.7)	35 (94.6)	37
Total	2	1	43	46

χ^2 = 1.446 df=2 p=0.485

Non stress test with neonatal complications

In this study it is found that non stress test have statistically significant association with neonatal complications in high risk group and low risk group ($p<0.05$).

Table- 34 : Non stress test with neonatal complications in high risk group

Non stress test	Neonatal complications		Total
	Yes N (%)	No N (%)	
Non reactive	5 (41.7)	7 (58.3)	12
Reactive	0 (0)	34 (100)	34
Total	5	41	46

$p=0.001^{**}$

Table- 35 : Non stress test with neonatal complications in low risk group

Non stress test	Neonatal complications		Total
	Yes N (%)	No N (%)	
Non reactive	3 (33.3)	6 (66.7)	9
Reactive	0 (0)	37 (100)	37
Total	3	43	46

$p=0.006^{**}$

Non stress test with NICU admission

In this study it is found that non stress test have statistically significant association with NICU admission in high risk group and low risk group ($p<0.05$).

Table- 36 : Non stress test with NICU admission in high risk group

Non stress test	NICU admission		Total
	No N (%)	Yes N (%)	
Non reactive	4 (33.3)	8 (66.7)	12
Reactive	33 (97.1)	1 (2.9)	34
Total	37	9	46

$p=0.000^{***}$

Table- 37 : Non stress test with NICU admission in low risk group

Non stress test	NICU admission		Total
	No N (%)	Yes N (%)	
Non reactive	5 (55.4)	4 (44.6)	9
Reactive	36 (97.3)	1 (2.7)	37
Total	41	5	46

$p=0.003^{**}$

Non stress test with intrapartum fetal distress

In this study it is found that non stress test have high significant association with intrapartum fetal distress in high risk group but it is less significant in low risk group ($p<0.05$).

Table- 38 : Non stress test with intrapartum fetal distress in high risk group

Non stress test	Intrapartum fetal distress		Total
	Yes N (%)	No N (%)	
Non reactive	9 (75)	3 (25)	12
Reactive	0 (0)	34 (100)	34
Total	9	37	46

$p=0.000^{***}$

Table- 39 : Non stress test with intrapartum fetal distress in low risk group

Non stress test	Intrapartum fetal distress		Total
	Yes N (%)	No N (%)	
Non reactive	3(33.3)	6 (66.7)	9
Reactive	1 (2.7)	36 (97.3)	37
Total	4	42	46

$p=0.004^{**}$

Non stress test with meconium stained

In this study it is found that non stress test have more significant association with meconium stained in high risk group as compared to low risk group ($p<0.05$).

Table- 40 : Non stress test with meconium stained in high risk group

Non stress test	Meconium stained		Total
	Yes N (%)	No N (%)	
Non reactive	4 (33.3)	8 (66.7)	12
Reactive	0 (0)	34 (100)	34
Total	4	42	46

$p=0.003^{**}$

Table- 41 : Non stress test with meconium stained in low risk group

Non stress test	Meconium stained		Total
	Yes N (%)	No N (%)	
Non reactive	4 (44.4)	5 (55.6)	9
Reactive	2 (5.4)	35 (94.6)	37
Total	6	40	46

$p=0.009^{**}$

Non stress test with quantity of liquor

In this study it is found that non stress test have very highly significant association with quantity of liquor in high risk group as compared to low risk group ($p<0.05$).

Table- 42 : Non stress test with quantity of liquor in high risk group

Non stress test	Quantity of liquor			Total
	Adequate N (%)	Less N (%)	More N (%)	
Non reactive	7 (58.3)	5 (41.7)	0(0)	12
Reactive	33 (97.1)	0 (0)	1 (2.9)	34
Total	40	5	1	46

$\chi^2 = 16.049$ df=3 $p=0.000^{***}$

Table- 43 : Non stress test with quantity of liquor in low risk group

Non stress test	Quantity of liquor		Total
	Adequate N (%)	Less N (%)	
Non reactive	6 (66.3)	3 (33.7)	9
Reactive	37 (100)	0 (0)	37
Total	43	3	46

$p=0.006^{**}$

Non stress test with APGAR at 5 min

In this study it is found that non stress test have highly significant association with APGAR at 5 min in high risk group as compared to low risk group ($p<0.05$).

Table- 44 : Non stress test with APGAR at 5 min in high risk group

Non stress test	**APGAR at 5**		**Total**
	Less than 7 N (%)	**More than 7 N (%)**	
Non reactive	4 (33.3)	8 (66.7)	12
Reactive	0 (0)	34 (100)	34
Total	4	42	46

$p=0.003^{**}$

Table- 45 : Non stress test with APGAR at 5 min in low risk group

Non stress test	APGAR at 5		Total
	Less than 7 N (%)	More than 7 N (%)	
Non reactive	2 (22.2)	7 (77.8)	9
Reactive	0 (0)	37 (100)	37
Total	2	44	46

$p=0.035^{*}$

DISCUSSION

NST is a common type of assessment to identify the risk factors in pregnant women. Many studies have been carried out previously to evaluate the efficiency of this test but there is no consensus to establish the prognostic value among different groups of pregnant women [56]. Researchers have considered NST as a useful tool especially in high-risk pregnancies.

Non stress test is a non-invasive procedure that is relatively simple as compared to other tests.[57] There have been many earlier studies that extensively discuss the probability of adverse outcomes such as meconium stained amniotic fluid, low APGAR score, and NICU admission. A reactive NST is a reliable indicator of fetal wellbeing in term fetus. It is considered as an ideal procedure to be used in low resource areas that screen antenatal cases and early intervention measures for minimizing perinatal morbidity. Antenatal fetal monitoring is done to identify the fetuses that are at a higher risk of intrauterine death. Intervention can be done in these cases before the damage happens.[58]

The main goal of antepartum surveillance methods is to identify fetal distress and thereby prevent fetal death. The study classifies pregnant women into both high risk and low risk. There are many organized methods available for managing the high risk group. In the same time, there needs to be more comprehensive methods to identify pregnant women in distress in the low-risk group. NST is identified as a useful tool to avoid obstetric litigation as parental expectation of a good outcome is extremely high. Most of the studies that have been take for comparison indicate that

randomized controlled trials are necessary to incorporate NST to monitor normal pregnancies.[59]

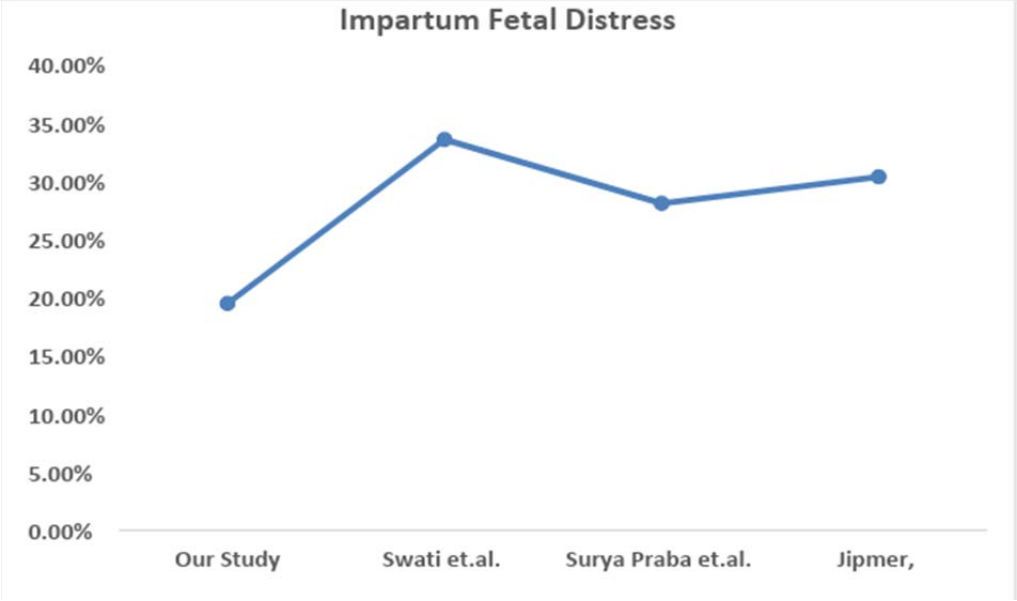
Table-46 : DISTRIBUTION OF RISK IN HIGH RISK GROUP

Risk	Swati et.al [60]	Our Study
GDM	43.10	17.4
Gestatinal hypertension	9.80	4.3
IUGR	3.90	4.3
IVF	2	8.7
Previous LSCS	16	4.3

The present study lists out the risk factors that could help in identifying the high-risk group. Factors like GDM, Gestational Hypertension, IUGR, IVF, and previous LSCS was compared with a study by Swati et.al. The percentage of GDM in our study was 17.4% while than in Swati et.al it was 43.10%. The value for gestational hypertension was 4.3% in our study in comparison to 9.80 in the study by Swati et.al. The values for IUGR, IVF, and previous LSCS was 3.90, 2, and 16 in Swati et.al. in comparison to 4.3, 8.7, and 4.3 in our study.

Table-47 : INTRAPARTUM FETAL DISTRESS

Our Study	19.50%
Swati et.al.[60]	33.60%
Surya Praba et.al.[63]	28.10%
Jipmer, 1988.[70]	30.40%



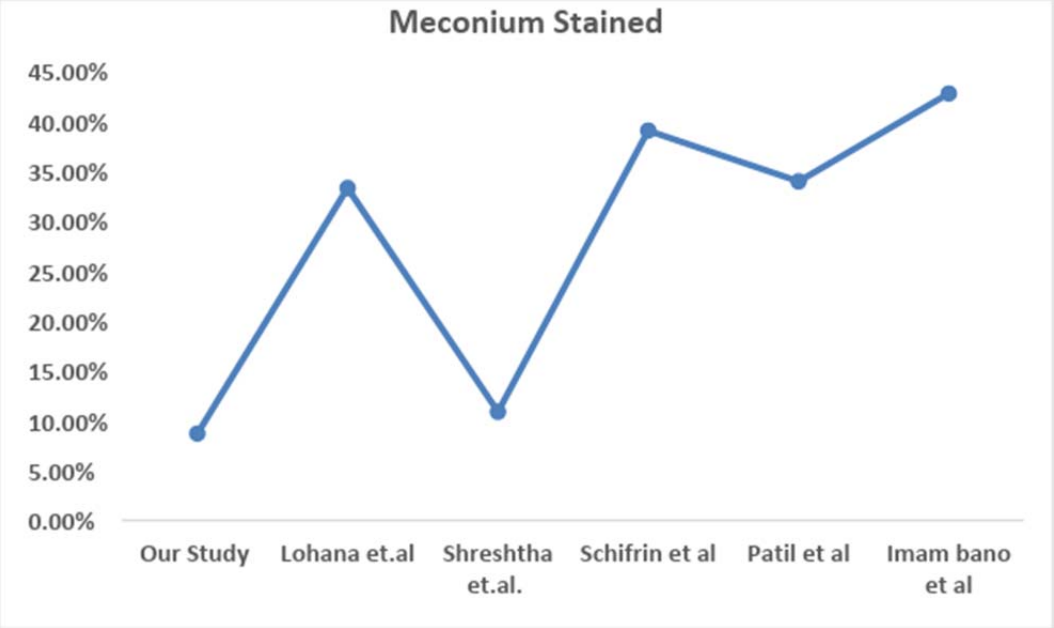
Graph-25 : **INTRAPARTUM FETAL DISTRESS**

In the present study it was found out that the Intrapartum Fetal Distress was 19.50% compared to 33.60% in a study by Swati et.al . In a study by Surya Praba et.al and Jipmer the intrapartum fetal distress was 28.10% and 30.40% respectively.

Table- 48 : MECONIUM STAINED

Our Study	8.7%
Lohana et.al.[61]	33.33%
Schifrin et al.[69]	39.1%
Patil et al.[66]	34%
Imam Bano et al.[67]	42.8%
Shreshtha et.al.[42]	10.9%

Graph-26 : MECONIUM STAINED

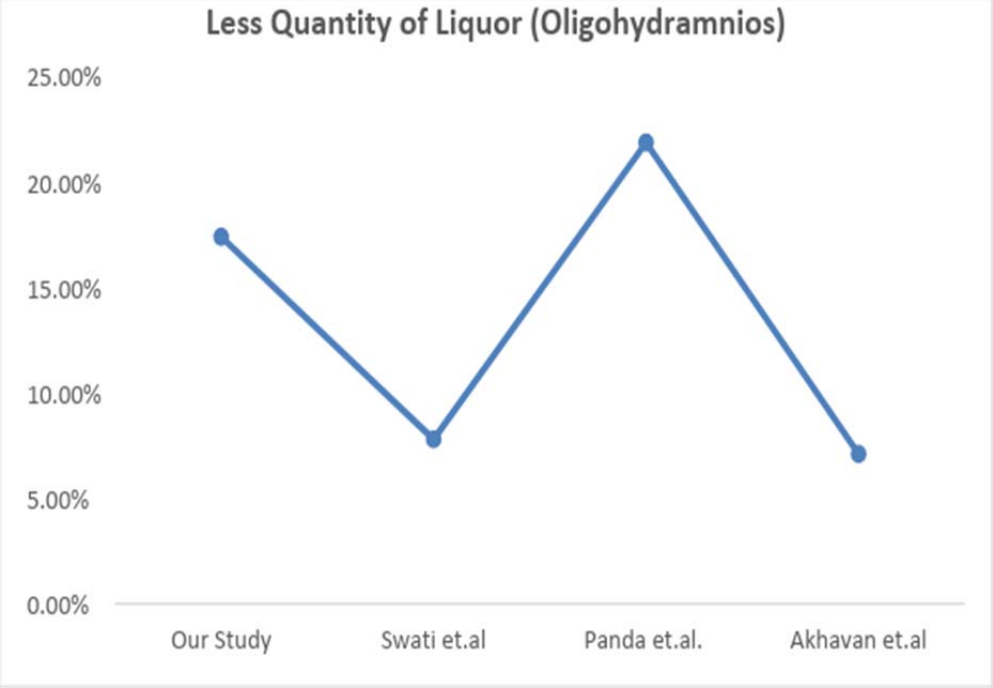


A study conducted by Lohana et al indicated the Meconium stained to be 33.33% in comparison to 39.1% as in a study by Schifrin et.al. In another study by Patil etal, Imam Bano et.al and Shreshtha et al the value of meconium stained was 34%, 42.8% and 10.9 % respectively.

Table- 49 : LESS QUANTITY OF LIQUOR (OLIGOHYDRAMNIOS)

Our Study	17.40%
Swati et.al.[60]	7.80%
Panda et.al.[37]	21.87%
Akhavan et.al.[65]	7.10%

Graph- 27 : LESS QUANTITY OF LIQUOR (OLIGOHYDRAMNIOS)

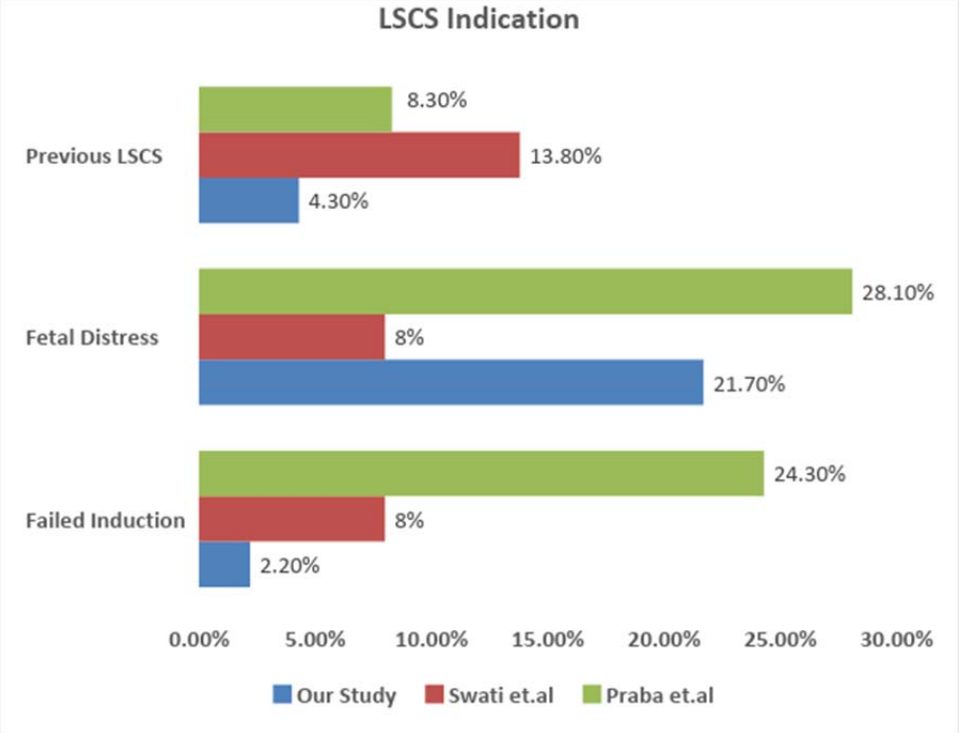


The less quantity of liquor (Oligohydramnios) was found to be 17.40% comparable to 7.80% in a study by Swati et.al. In a study conducted by Panda et.al. the value of oligohydramnios was determined to be 21.87% compared to 7.10% in a study conducted by Akhavan et.al.

Table- 50 : LSCS INDICATION

	Failed Induction	Fetal Distress	Previous LSCS
Our Study	2.20%	21.70%	4.30%
Swati et.al.[60]	8%	8%	13.80%
Praba et.al.[63]	24.30%	28.10%	8.30%

Graph- 28 : : LSCS INDICATION

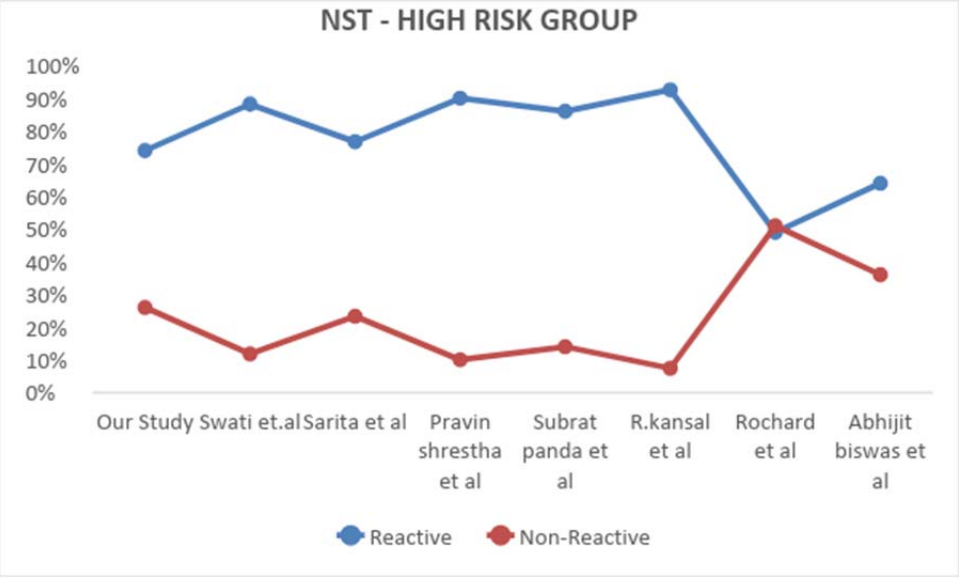


The present study is compared with the works done by Swati et al and Praba et.al for the LSCS indication. The failed induction in the present study is 2.20% while the studies carried out by Swati etal and Praba etal indicates 8% and 24.30% respectively. The fetal distress in the present study is 21.70% and the previous LSCS is 4.30%. The study done by Swati et.al indicates a value of 8% and 13.80% respectively while the study done by Praba etal indicates a value of 28.10 and 8.30% respectively.

Table- 51: NON STRESS TEST

	High Risk		Low Risk	
	Reactive	**Non-Reactive**	**Reactive**	**Non-Reactive**
Our Study	74%	26%	80.4%	19.6%
Swati et.al.[60]	88.20%	11.80%	92%	8%
Sarita et al.[50]	76.69%	23.31%		
Pravin shrestha et al.[42]	90%	10%		
Subrat panda et al.[37]	86%	14%		
R. Kansal et al.[62]	92.6%	7.4%		
Kubli et al.[64]	35%	65%		
Rochard et al.[68]	49%	51%		
Abhijit biswas et al.[46]	64%	36%		

Graph- 29 : NON STRESS TEST



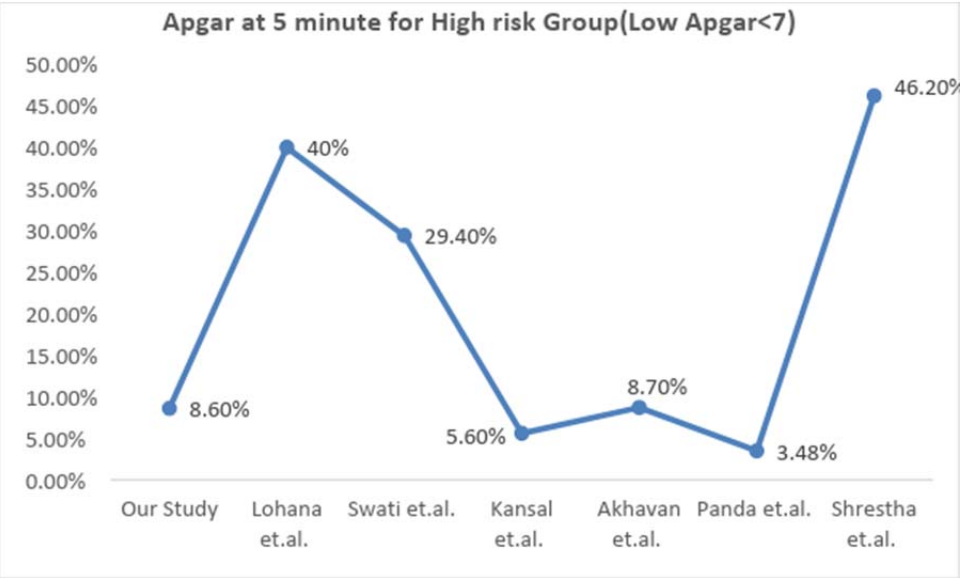
The values in Non-stress test were categorized as reactive and non-reactive in our study. The percentage value in our study for the high risk group showed 74% for reactive while 26% for non-reactive. The low risk group similarly showed values of 80.4% and 19.6% respectively for reactive and non-reactive. The study by Swati

et.al. showed values of 88.20% and 11.80 % for reactive and non-reactive in the high risk group. The low risk group showed values of 92% and 8% for reactive and non-reactive respectively. The study carried out by Sarita et.al showed values of 76.9% and 23.31% for reactive and non-reactive in the high risk group. Studies done by Shreshtha et al, Panda et al,Kansal et.al, Kubli et al, Rochard et.al., and Biswas et.al., had values of 0 and 10%, 86 and 14%, 92.6 and 7.4%, 35 and 65%, 49 and 51%, 64 and 366% for the reactive and non-reactive groups.

Table- 52 : APGAR <7 AT 5 MINUTE FOR HIGH RISK GROUP

Our Study	8.60%
Lohana et.al.[61]	40%
Swati et.al.[60]	29.40%
Kansal et.al.[62]	5.60%
Akhavan et.al.[65]	8.70%
Panda et.al.[37]	3.48%
Shrestha et.al.[42]	46.20%

Graph- 30 : APGAR <7 AT 5 MINUTE FOR HIGH RISK GROUP

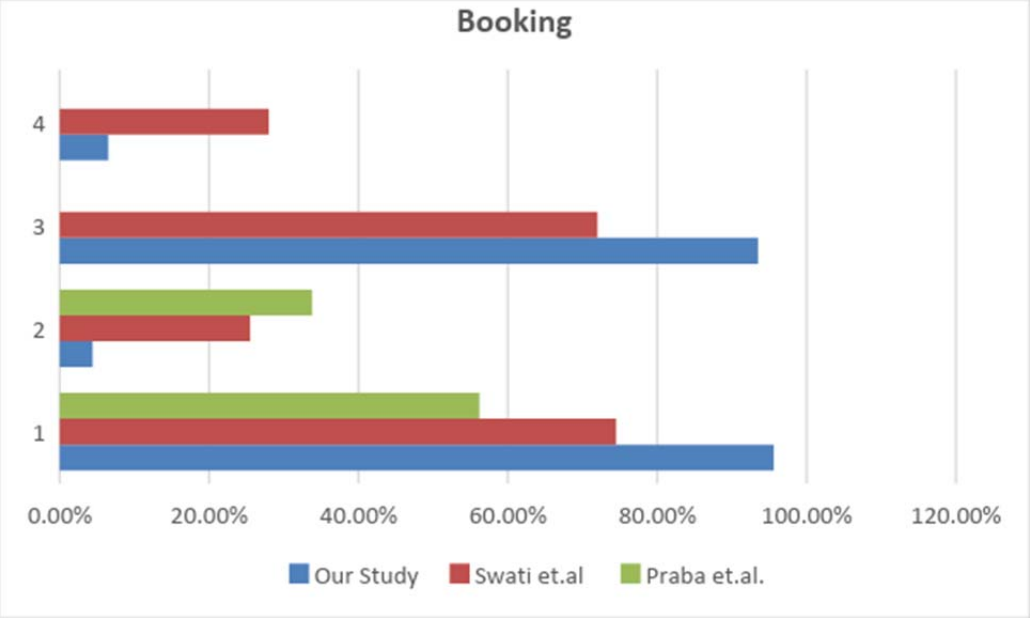


A study done by Lohana et.al depicts the low Apgar at 5 minute for high risk group is 40%. A related study done by Swati et.al , Kansal et.al , Akhavan et.al, Panda et.al., and Shreshtha et.al shows the low Apgar at 5 minute as 29.40%, 5.60%, 8.70%, 3.48% and 46.20% respectively.

Table- 53 : BOOKING

	High Risk		Low risk	
	Booked	**Unbooked**	**Booked**	**Unbooked**
Our Study	95.60%	4.40%	93.50%	6.50%
Swati et.al.[60]	74.50%	25.50%	72%	28%
Praba et.al.[63]	56.20%	33.80%	-	-

Graph- 31 : BOOKING

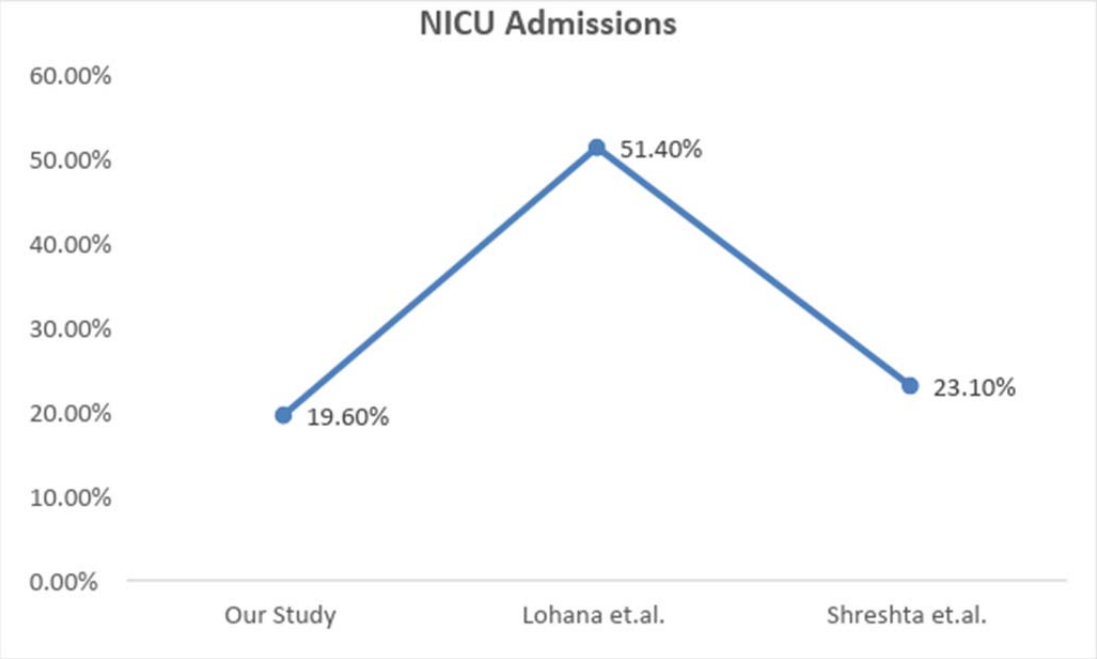


The booked cases in the high risk group for the present study was 95.60%. The unbooked cases was 4.40%. The study carried out by Swati et.al. shows the booked cases at 74.50% and unbooked at 25.50%. The study carried out by Praba et.al. denoted the values at 56.20% and 33.80% respectively.

Table- 54 : NICU ADMISSIONS

Our Study	19.60%
Lohana et.al.[61]	51.40%
Shreshta et.al.[42]	23.10%

Graph- 32 : NICU ADMISSIONS

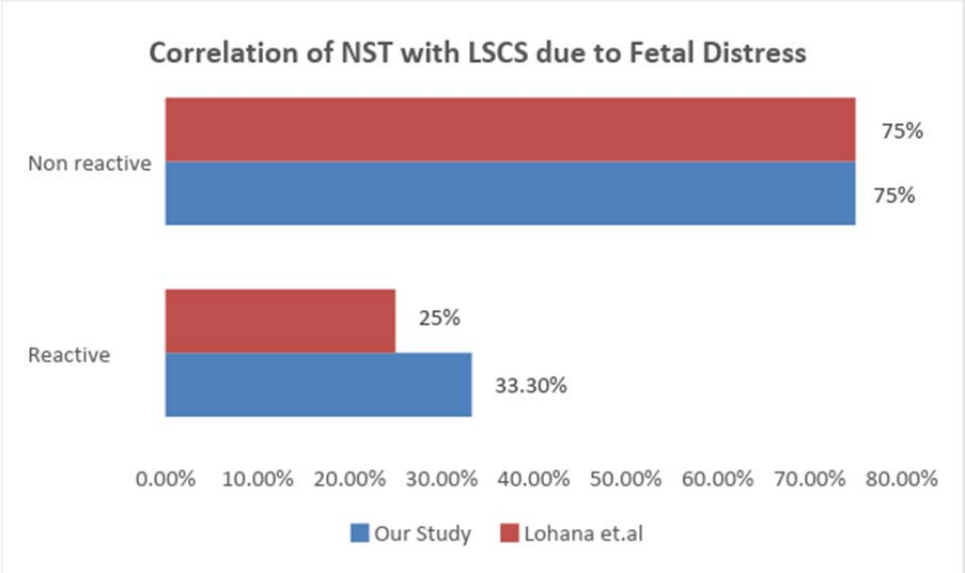


The NICU admissions in the present study is 19.60%. A comparison with the studies done by Lohana etal and Shreshtha et al depicts these values at 51.40% and 23.10% respectively.

Table- 55 : CORRELATION OF NST WITH LSCS DUE TO FETAL DISTRESS

	Reactive	Non reactive
Our Study	**33.30%**	**75%**
Lohana et.al.[61]	**25%**	**75%**

Graph- 33 : CORRELATION OF NST WITH LSCS DUE TO FETAL DISTRESS

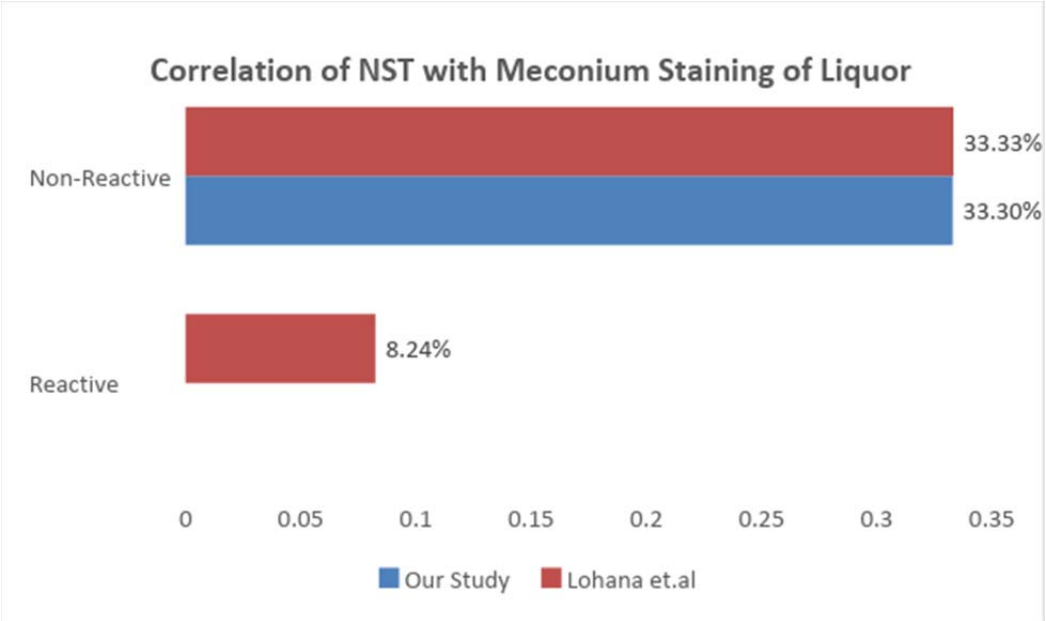


The correlation of NST with LSCS due to fetal distress has been made in the present study. A comparison is made between the present study and a study done by Lohana et.al. The present study shows a percentage value of 33.30% and 75% respectively for reactive and non-reactive respectively. The study done by Lohana et.al. Indicates a value of 25% and 75% respectively for reactive and non-reactive.

Table- 56 : CORRELATION OF NST WITH MECONIUM STAINING OF LIQUOR

	Reactive	Non-Reactive
Our Study	0	33.30%
Lohana et.al.[61]	8.24%	33.33%

Graph- 34 : CORRELATION OF NST WITH MECONIUM STAINING OF LIQUOR



A comparison of the correlation of NST with Meconium staining for liquor has been carried out. The comparison has been made between the present study and a study done by Lohana et.al. The non-reactive percentage values in the present study and for the study done by Lohana et.al both indicated around 33%

Table- 57: CORRELATION OF NST WITH LOW APGAR SCORE AT 5 MIN

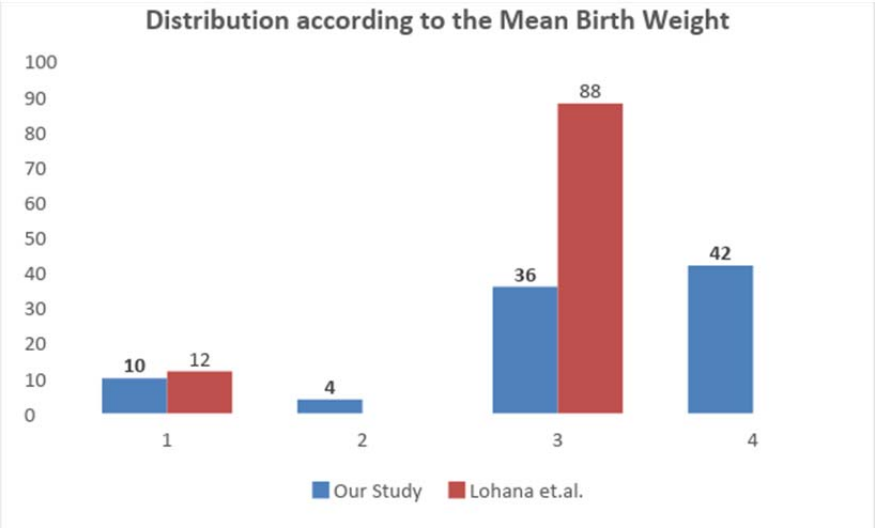
	Reactive	**Non-Reactive**
Our Study	High-91.4%	High-8.6%
	Low-95.7%	Low risk-4.3%
Lohana et.al.[61]	3.53%	40%

A correlation of NST with low Apgar score at 5 min has been carried out and compared with the work done by Lohana et.al. The study done by Lohana et.al. indicates a percentage value of 40% for the non-reactive while the present study shows 8.6%.

Table- 58: DISTRIBUTION ACCORDING TO THE MEAN BIRTH WEIGHT

	Less than 2.5 kg		**More than 2.5 kg**	
	High	**Low**	**High**	**Low**
Our Study	10	4	36	42
Lohana et.al.[61]	12		88	

Graph- 35 : DISTRIBUTION ACCORDING TO THE MEAN BIRTH WEIGHT



A comparative study about the correlation of NST with Fetal outcome in high risk pregnancy depicts the distribution according to the mean birth weight. The

present study has been distinguished into the high risk and low risk category. The comparison has been made based on a study by Lohana et.al . The results indicate 10 cases under 2.5 kg in our study while 12 cases in the study by Lohana et.al . The number of cases in which the weight was more than 2.5 kg were 36 in our study while in the study by Lohana et.al it was 88.

CONCLUSION

NST is simple, cheap, non-harmful, non-invasive, easily repeated, and cost effective with low maintenance profile and needs less training.

Reactive NST is reassuring and indicates fetal wellbeing, but non-reactive NST alone cannot be taken as an indicator of fetal jeopardy. Ante partum fetal monitoring has proved to be beneficial in assessing the fetal wellbeing, when employed in time the perinatal morbidity and mortality can be reduced.

In the present study, we noted the following findings, Probability of adverse outcome such as meconium stained amniotic fluid, low APGAR score, NICU admission increased with non-reactive NST. Hence this simple test could be a good option to use in low resource centres,to screen antenatal cases and early intervention measures for reducing perinatal morbidity.NST was reactive in 74% and non-reactive in 26% high risk group.

Fetal death rate is lower in population undergoing antepartum testing as compared to general untested population. Protocols using adjunctive tests (Biophysical profile, color Doppler) helps to further improve obstetric outcomes. We are able to save the babies in cases of non-reactive non-stress tests by prompt termination of pregnancy when the baby was salvageable.

SUMMARY

Pregnant women attending Obstetrics and Gynaecology outpatient department, Sree Mookambika Institute of Medical Science Kulasekharam, who fulfilled the inclusion and exclusion criteria, were selected. One group consisted of those women who were high-risk pregnancy. Second group/control group, consisted of women who were at low risk. Both group have 46 cases.

- There was a significant difference, in the age between the two groups, in the present study we found that the low risk group age is in between 20-30 years while in high risk group, cases were found above 30yrs and below 20 years.
- The high risk group has 2 unbooked cases, of which one was unaware of pregnancy till 5 months, while in the low risk group 3 were unbooked cases. Stating that, importance of antenatal checkups, in early detection of high risk cases for proper surveillance and for the wellbeing of the mother and the fetus.
- There was no difference, in the period of gestation , in both the groups.
- Both groups have one preterm case but post term is more in low risk group.
- The low risk group had 29 cases(63percent) who were primigravida as compared to 11 cases, in the high risk group The difference was statistically significant with p value less than 0.05 and the number of living children were less, in the high risk group this was also statistically significant with p value less than 0.05.
- The high risk group had a higher value of non-stress test compare to low risk group,high risk has 26% while low risk has 19.6%.

- There was a difference, in the number of cases whose liquor was stained by meconium, it was high number of meconium stained liquor seen in low risk group compared to high risk group.
- There was a difference in less amount of liquor, in the two groups with p value more than 0.05.,The high risk group has 10.9% but low risk has only 6.5% cases with less liquor .There is association of less amount of liquor with nst in high risk group, out of 12 nonreactive NST 5 Was having less liquor.
- There was a difference , in the number of cases requiring LSCS , in the two groups with p value more than 0.05.,The high risk group had a higher incidence of LSCS with less liquor and non-reactive NST (24:9)
- Indications of LSCS revealed, the most common indication for LSCS was fetal distress followed by GDM in High risk group, bt previous LSCS in low risk group.
- Elderly primi was the commonest risk factor of the mother (26 of 46 cases), the younger and the advanced age were at a higher risk.
- SGA is seen more in high risk group and LGA is seen only in the high risk group in GDM cases,
- There was a difference, in the LOW APGAR score at 5minutes, in the two groups with p value more than 0.05.High risk group have 4 cases with low APGAR score out of 12 non-reactive NST so there is high association between NST and low APGAR score at 5 min.

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SREE MOOKAMBIKA INSTITUTE OF MEDICAL SCIENCES

KULASEKHARAM

RESEARCH COMMITTEE

CERTIFICATE

This is to certify that The Research Protocol Submitted by DR. ASTHA BHUTIYANI

Faculty / Post Graduate from Department of OBSTETRICS AND GYNE-COLOGY *Titled* CORRELATION OF NON STRESS TEST WITH FETAL OUTCOME IN HIGH RISK PREGNANCY AT TERTIARY HOSPITAL

is approved by the Research Committee.

Chair Person

Prof. & H.O.D.
Dept. of Bio-Chemistry
Sree Mookambika Institute of Medical Sciences
Kulasekharam 629 161

Convenor

Prof. & H.O.D.
Dept. of Physiology
Sree Mookambika Institute of Medical Sciences
Kulasekharam 629 161

Date :

INSTITUTIONAL HUMAN ETHICS COMMITTEE

SREE MOOKAMBIKA INSTITUTE OF MEDICAL SCIENCES,
KULASEKHARAM, TAMILNADU

Communication of Decision of the Institutional Human Ethics Committee(IHEC)

SMIMS/IHEC No:1 /Protocol no:34/ 2016

Protocol title: CORRELATION OF NON STRESS TEST WITH FETAL OUTCOME IN HIGH RISK PREGNANCY AT TERTIARY HOSPITAL
Principal Investigator: Dr.Astha Bhutiyani
Name& Address of Institution: Department of Obstetrics and Gynaecology Sree Mookambika Institute of Medical Sciences, Kulasekharam ☑ New review ☐ Revised review ☐ Expedited review
Date of review (D/M/Y): 15.12.2016 Date of previous review , if revised application:
Decision of the IHEC: ☑ Recommended ☐ Recommended with suggestions ☐ Revision ☐ Rejected
Suggestions/ Reasons/ Remarks:
Recommended for a period of :

Please note*

- Inform IHEC immediately in case of any Adverse events and Serious adverse events.
- Inform IHEC in case of any change of study procedure, site and investigator
- This permission is only for period mentioned above. Annual report to be submitted to IHEC.
- Members of IHEC have right to monitor the trial with prior intimation.

Reneegalyangadkar

Signature of Member Secretary IHEC

SREE MOOKAMBIKA INSTITUTE OF MEDICAL SCIENCES * KULASEKHARAM *
IHEC
Date 21/12/16

SREE MOOKAMBIKA INSTITUTE OF MEDICAL SCIENCES
Padanilam, Kulasekharam, K.K. Dist, Tamilnadu – 6291 61
DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Title : correlation Of NST with fetal outcome in high risk pregnancy
CASE RECORD FORM

Name: Age OP No.:

Address: Contact number:

Educational qualification: i)Illiterate ii)Primary education iii)Predegree iv)Graduate v)Postgraduate

LMP: EDC:

Gestational age at examination : ..... weeks ..... day/s

1. MENSTRUAL HISTORY:

   a. Duration of cycle: i)<21 ii)21-35 iii)>35

   b. Number of pads changed/day: i)<=3 ii)4-7 iii)8-10 iv)>10

   c. Passage of clots: yes/no

2 MARITAL HISTORY :

   Married life…… Consangious marrige….. non consangious marriage…..

   Infertility treated……..

3. PRESENT OBSTETRIC HISTORY[01- Present 02- Absent]

Anaemia : _ IUGR : _ PIH : _ _Preeclampsia : _ _ Oligohydramnios… APH….

GDM : _ _ Renal Disease : _ Thyroid Disease : _ _

Any medical condition : _ _If any, specify

4 . PAST HISTORY

H/O Diabetes, hypertension ,thyroid ,cardiac disease, tuberculosis ,epilepsy ,asthma

5 . FAMILY HISTORY

H/O Diabetes, hypertension ,thyroid ,cardiac disease, tuberculosis ,epilepsy ,asthma

6. ANTENATAL HISTORY

H/o bleeding p/v ,headache , blurring of vision, fever , increase frequency of micturition, decrease fetal movements,

GENERAL EXAMINATION:

1. Pallor: yes/no
2. Icterus yes/no
3. Pedal oedema: yes/no
4. Pulse Rate: i)<60/mt ii)60-100/mt iii)>100/mt
5. B.P i)120/80mmhg ii)120-160/80-100mmhg iii) >160/100mmhg
6. Ht, weight

NST

i)gestational age at the time of nst: <37 completed weeks / >=37 completed weeks

ii) Reactive……..Nonreactive…….

PERINATAL OUTCOME

Date of Delivery : ...../...../201.....

Gestational age at delivery : ..... weeks ..... day/s

IUGR [01- Present 02- Absent] : _ _

Foetal Distress [01- Present 02- Absent] : _ _

Mode of Delivery : [1)Normal vaginal , (2) LSCS

Live Birth [01] /Still Birth [02] : _ _

Term[01] /Pre term [02] : _ _

Birth weight : ..... gms

SGA[01 – Present 02 - Absent]: : _ _

APGAR score : .....

Neonatal complications : _ _[01 – Present 02 - Absent]

If present, specify

.....

NICU stay : _ _[01 – Present 02 - Absent]

CONSENT FORM

INFORMATION FOR PARTICIPANTS OF THE STUDY

We welcome you and thank you for your keen interest and participation in this research project. Before you participate in this study it is important for you to understand why this research is being carried out. This form will provide you all the relevant details of this research .It will explain the nature, purpose, the benefits, the risks, the discomforts, the precautions, and the information about how this project will be carried out. It is important that you read and understand the contents of the form carefully. This form may contain certain scientific terms and hence if you have any doubts or if you want more information, you are free to ask the study personnel or the contact person mentioned below before you give your consent and also at any time during the entire course of the project.

1. Name of the principal investigator :

Dr. Astha bhutiyani
Post graduate student
M. S. Obstetrics and Gynaecology
Sree Mookambika Institute of Medical Science,
Kulasekharam.

2. **Name of the Guide:**

Dr.Rema.v.nair
Professor
Obstetrics & Gynaecology
Sree Mookambika Institute of Medical Science,
Kulasekharam.

Name of the Co-Guide:

Dr.sree lakshmi
Associate Professor
Obstetrics & Gynaecology
Sree Mookambika Institute of Medical Science

3. Title of the study:

CORELATION OF NST WITH FETAL OUTCOME IN HIGH RISK PREGNANCY

5 Background information:

Freeman and lee collegues(1975) introduce non stress test to describe fetal heart rate acceleration in response to fetal movements as a sign of fetal health. This test involves use of doppler detected fetal heart rate acceleration coincident with fetal movements perceived by mother. Gestational age influences acceleration or reactivity of FHR. NST is simple, non invasive test that can be repeated as often as necessary. Assumption of NST is that if FHR acceleration are absent for prolonged period of time there is likelihood of fetal hypoxemia.

6 Aims and objectives:

- To evaluate the role of NST in high risk pregnancy with relation to perinatal outcome.

7 . Scientific justification of the study:

Risk factors associated with pregnancy can bring about unfavourable perinatal outcomes in fetus such as fetal distress requiring emergency LSCS, SGA, NICU admission etc. With early antenatal evaluation, unfavourable outcome of fetus can be predicted and subjected to timely intervention in unfavourable situation. Hence early detection and improved treatment is required to increase number of favourable perinatal outcome. The effective diagnosis and management of perinatal morbidity and mortality involves multidisciplinary approach to their screening. This

study will help in timely diagnosis & intervention in high risk pregnant women with fetal distress and decrease perinatal mortality and morbidity.

Procedure of the study:

All patients with valid consent will undergo the following:

- Complete history and thorough clinical examination will be done and these patients will be subjected to NST.
- Clinical and NST findings from the study will be recorded as per the proforma.
- Patients will be followed up till delivery and pregnancy outcomes will be assessed.

10. Expected risks for the participants: Minimal risk

11. Expected benefits of research for the participants: This study will help in timely diagnosis and intervention in high risk gravid women and hence help improve the pregnancy outcome and decrease perinatal morbidity and mortality. This study will also be beneficial for the betterment of the Health Sector in Kanyakumari district of Tamil Nadu.

12. Maintenance of confidentiality: Yes

13. Why have I been chosen to be in the study?

You have been chosen to be a part of this study because you are a pregnant woman who has presented to the Obstetrics Outpatient department for antenatal checkup

14. How many patients will be in the study?

15. Agreement of compensation to the participants (in case of a study related injury): Not applicable

16. Anticipate prorated payment, if any to the participants of the study? Not applicable

17. Can I withdraw from the study, at any time during the study period? Yes

18. If there is any new findings / information, would I be informed? Yes

19. Expected duration of the participant's participation in the study: Till the delivery of the baby

20. Any other pertinent information? Nil

21. Whom do I contact for further information?

For any study related queries you are free to contact:
ASTHA BHUTIYANI
Post Graduate - M. S. (OBSTETRICS AND GYNAECOLOGY),
Department of OBSTETRICS AND GYNAECOLOGY,
SREE MOOKAMBIKA INSTITUTE OF MEDICAL SCIENCES,
KULASEKHARAM
Mobile number: 08449855787
Email.id: astha.bhutiyani@gmail.com

Place: Kulasekharam

Date:

Signature of Principal investigator **Signature of participant**

PARTICIPANTS CONSENT FORM

PART – 2 OF 2

The details of the study have been explained to me in writing and the details have been fully explained to me. I am aware that the results of the study may not be directly beneficial to me but will help in the advancement of medical sciences. I confirm that I have understood the study and had the opportunity to ask questions. I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without the medical care that will normally be provided by the hospital being affected. I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s). I have been given an information sheet giving details of the study. I fully consent to participate in the study titled.

Serial no/Reference no:

Name of participant : **Address :**

Contact no : **Signature of the participant**

Witness

Date :

Place : Kulasekharam

Sl.No	GROUP	maternal age in (yrs)	period of gestation (wk+day)	Gravidity	IP No	RISK	INTRAPARTUM FETAL DISTRESS	meconium stained	QUANTITY OF LIQUOR	interval nst at delivery	delivery time	LSCS indication	delivery mode	R/NR	Induced	APGAR AT 5	Sex	Foot length (cms)	Head circumference (cms)	Crown-heel length (cms)	Birth weight (kg)	Appropriate for gestational age	TERM	booked	rx infertility	NICU adms	no. of days in nicu	neonatal complications	LIVEORSTILLBIRTH
1	NORMAL	27	38+6	G2P1L1	666712	no	no	no	adequate	28 HR	30.4 AM	not done	VD	NR	i	7	Female	7.8	32.7	47.5	2.75	AGA	T	b	no	no	no	no	LIVE
2	NORMAL	29	38+5	G3P2L2	666742	no	no	no	adequate	11 HR	20.1 PM	not done	VD	R	i	7	Male	8	34.5	48.5	3.25	AGA	T	b	no	no	no	no	LIVE
3	NORMAL	21	38+4	PRIMI	666546	no	no	no	adequate	17 HR 15 MIN	05.10 AM	not done	VD	NR	i	8	Male	7.4	33.5	49	2.5	AGA	T	nb	no	no	nn	no	LIVE
4	NORMAL	22	38+2	PRIMI	666509	no	no	no	adequate	33 HR 30MIN	23.8 AM	not done	VD	R	NI	9	Male	8.2	35	50	3.25	AGA	T	b	yes	no	no	no	STILL
5	NORMAL	21	38+1	PRIMI	666503	no	yes	no	LESS	26 HR 10 MIN	40.9 AM	not done	VD	NR	i	7	Female	8.1	34	49	3	AGA	T	b	no	yes	1	MAS	LIVE
6	NORMAL	22	38+2	PRIMI	1421	no	no	no	adequate	35 HR 30 MIN	35.4 PM	not done	VD	R	i	9	Female	6.7	31.5	46	2	SGA	T	b	no	no	n	no	LIVE
7	NORMAL	25	38+1	PRIMI	22716	no	no	no	adequate	70 HR 15 MIN	10.8 PM	not done	VD	R	NI	9	Female	7.6	32.5	46.5	2.6	AGA	T	b	no	no	n	no	LIVE
8	NORMAL	30	38+2	G3P2L2	666758	no	yes	yes	adequate	19 HR 10 MIN	25.10 PM	not done	VD	NR	i	5	Male	7.3	32.5	47	2.2	SGA	T	b	no	yes	2	rds	LIVE
9	NORMAL	25	38+5	G3P2L2	3950	no	no	no	adequate	22 HR 20 MIN	20.1 AM	not done	VD	R	NI	9	Female	8.1	34	50	3.2	AGA	T	b	no	no	n	no	LIVE
10	NORMAL	27	36+5	G3P2L2	23446	no	no	no	adequate	34 HR 10 MIN	35.10 AM	not done	VD	R	NI	9	Female	7.8	33	49	2.8	AGA	PRETERM	b	no	no	n	no	LIVE
11	NORMAL	20	38+6	PRIMI	1336	no	no	no	adequate	22 HR 15 MIN	45.9 AM	not done	VD	R	NI	9	Female	7.5	48	33	3	AGA	T	b	no	no	n	no	LIVE
12	NORMAL	25	38+1	PRIMI	4592	no	no	no	adequate	37 HR 15 MIN	40.4 AM	not done	VD	R	I	8	Female	7.6	48	33	3	AGA	T	UB	no	no	n	no	LIVE
13	NORMAL	21	38+4	PRIMI	1359	no	no	no	adequate	16 HR	20.2 PM	not done	VD	R	NI	9	Female	7.6	49	33	2.6	AGA	T	b	no	no	n	no	LIVE
14	NORMAL	29	37+3	G3P2L2	23364	no	no	no	LESS	51 HR 10 MIN	20.1 AM	M	LSCS	NR	NI	9	Male	6.5	32.5	48.5	2.5	AGA	T	b	no	YES	n	NO	LIVE
15	NORMAL	23	38+1	PRIMI	666494	no	no	no	adequate	14 HR	25.1 PM	not done	VD	R	NI	9	Female	7.5	48.5	34	2.5	AGA	T	b	no	no	n	no	LIVE
16	NORMAL	20	38+2	PRIMI	4590	no	no	no	adequate	23 HR 30 MIN	40.2 PM	not done	VD	R	I	9	Male	7.4	33	48	2.5	AGA	T	b	no	no	n	no	LIVE
17	NORMAL	28	37+1	G3P2L2	23418	no	no	no	-adequate	26 HR	45.8 PM	PREV LSCS	LSCS	R	NI	9	Female	7.8	49	33.3	2.6	AGA	T	b	no	no	n	no	LIVE
18	NORMAL	25	40+2	PRIMI	666415	no	no	no	LESS	64 HR	20.11 AM	not done	VD	NR	I	7	Female	7.8	49.2	32.8	2.7	AGA	POSTTERM	UB	no	yes	1	MAS	LIVE
19	NORMAL	25	37+4	PRIMI	3962	no	no	no	adequate	53 HR 10 MIN	10.1 AM	not done	VD	R	NI	9	Male	7.8	33.5	48	2.5	AGA	T	b	no	no	n	no	LIVE
20	NORMAL	20	38+1	PRIMI	1324	no	no	no	adequate	19 HR 30 MIN	15.4 AM	not done	VD	R	NI	9	Male	7.8	32.5	48.5	2.5	AGA	T	b	no	no	n	no	LIVE
21	NORMAL	25	38+4	PRIMI	1342	no	no	no	adequate	10 HR 10 MIN	55.8 AM	not done	VD	R	NI	9	Female	7.7	32.5	47.5	2.5	AGA	T	b	no	no	n	no	LIVE
22	NORMAL	25	38+1	PRIMI	4593	no	no	yes	adequate	26 HR	45.5 PM	M	LSCS	NR	I	8	Male	7	33	49	2.7	AGA	T	b	no	no	n	no	LIVE
23	NORMAL	25	38+6	G2P1L1	4756	no	no	no	adequate	12 HR 10 MIN	30.7 AM	not done	VD	R	I	9	Female	7.5	32.5	48	2.7	AGA	T	b	no	no	n	no	LIVE
24	NORMAL	29	38+5	G3P2L2	666742	no	no	no	adequate	11 HR	20.1 PM	not done	VD	R	NI	7	Male	8	33	48.5	2.6	AGA	T	b	no	no	n	no	LIVE

Sl.No	GROUP	maternal age in (yrs)	period of gestation (wk+day)	Gravidity	IP No	RISK	INTRAPARTUM FETAL DISTRESS	meconium stained	QUANTITY OF LIQUOR	interval nst at delivery	delivery time	LSCS indication	delivery mode	R/NR	Induced	APGAR AT 5	Sex	Foot length (cms)	Head circumference (cms)	Crown-heel length (cms)	Birth weight (kg)	Appropriate for gestational age	TERM	booked	rx infertility	NICU adms	no. of days in nicu	neonatal complications	LIVEORSTILLBIRTH
25	NORMAL	21	38+4	PRIMI	666546	no	yes	yes	adequate	17 HR 15 MIN	05.10 AM	not done	VD	NR	I	8	Female	7.7	33	48	2.6	AGA	T	b	no	no	n	no	LIVE
26	NORMAL	22	38+2	PRIMI	666509	no	no	no	adequate	33 HR 30MIN	23.8 AM	not done	VD	R	NI	9	Male	7.4	33	48	2.5	AGA	T	b	no	no	n	no	LIVE
27	NORMAL	21	38+1	PRIMI	666503	no	no	no	adequate	26 HR 10 MIN	40.9 AM	not done	VD	R	NI	9	Female	7.6	33.5	48.5	2.8	AGA	T	b	no	no	n	no	LIVE
28	NORMAL	22	38+2	PRIMI	1421	no	no	no	adequate	35 HR 30 MIN	35.4 PM	not done	VD	R	NI	9	Female	7.7	34	49	2.6	AGA	T	b	no	no	n	no	LIVE
29	NORMAL	25	38+1	PRIMI	22716	no	no	no	adequate	70 HR 15 MIN	10.8 PM	not done	VD	R	NI	9	Female	8.3	35.2	50	3.6	AGA	POST TERM	b	no	no	n	no	LIVE
30	NORMAL	30	38+2	G3P2L2	666758	no	yes	yes	adequate	19 HR 10 MIN	25.10 AMM	M	LSCS	R	NI	FD	Male	7.8	327	47.5	2.75	AGA	T	b	no	no	n	no	LIVE
31	NORMAL	25	38+5	G3P2L2	3950	no	no	no	adequate	22 HR 20 MIN	20.1 AM	not done	VD	R	NI	9	Male	8	34.5	48.5	3.25	AGA	T	b	no	no	n	no	LIVE
32	NORMAL	27	37+1	G3P2L2	23446	no	no	no	adequate	34 HR 10 MIN	35.10 AM	not done	VD	R	NI	9	Male	7.4	33.5	49	2.5	AGA	T	b	no	no	n	no	LIVE
33	NORMAL	20	38+6	PRIMI	1336	no	no	no	adequate	22 HR 15 MIN	45.9 AM	not done	VD	R	NI	9	Male	8.2	35	50	3.25	AGA	T	b	no	no	n	no	LIVE
34	NORMAL	25	38+1	PRIMI	4592	no	no	no	adequate	37 HR 15 MIN	40.4 AM	not done	VD	R	I	8	Male	8.1	34	49	3	AGA	T	b	no	no	n	no	STILL
35	NORMAL	21	38+4	PRIMI	1359	no	no	no	adequate	16 HR	20.2 PM	not done	VD	R	NI	9	Male	6.7	31.5	46	2	SGA	T	b	no	no	n	no	LIVE
36	NORMAL	29	37+3	G3P2L2	23364	no	no	yes	LESS	51 HR 10 MIN	20.1 AM	not done	VD	NR	I	9	Female	7.6	32.5	46.5	2.6	AGA	T	b	no	no	n	no	LIVE
37	NORMAL	23	38+1	PRIMI	666494	no	no	no	adequate	14 HR	25.1 PM	not done	VD	R	NI	8	Male	7.3	32.5	47	2.2	SGA	T	b	no	YES	n	no	LIVE
38	NORMAL	20	38+2	PRIMI	4590	no	no	no	adequate	23 HR 30 MIN	40.2 PM	not done	VD	R	I	9	Male	8.1	34	50	3.2	AGA	T	b	no	no	n	no	STILL
39	NORMAL	28	37+1	G3P2L2	23418	no	no	no	adequate	26 HR	45.8 PM	not done	VD	R	I	9	Female	7.8	33	49	2.8	AGA	T	b	no	no	n	no	LIVE
40	NORMAL	25	38+2	PRIMI	666415	no	no	no	adequate	64 HR	20.11 AM	not done	VD	R	NI	7	Male	7.5	48	33	3	AGA	T	b	no	no	n	no	LIVE
41	NORMAL	25	37+4	PRIMI	3962	no	no	no	adequate	53 HR 10 MIN	10.1 AM	not done	VD	R	I	9	Female	7.8	33	49	2.8	AGA	T	b	no	no	n	no	LIVE
42	NORMAL	20	38+1	PRIMI	1324	no	no	no	adequate	19 HR 30 MIN	15.4 AM	not done	VD	R	I	9	Male	7.6	49	33	2.6	AGA	T	b	no	no	n	no	LIVE
43	NORMAL	25	38+4	PRIMI	1342	no	no	yes	adequate	10 HR 10 MIN	55.8 AM	not done	VD	R	NI	9	Female	7.8	33	49	2.8	AGA	T	b	no	no	n	no	LIVE
44	NORMAL	25	38+1	PRIMI	4593	no	no	no	adequate	26 HR	45.5 PM	not done	VD	R	I	8	Male	7.5	48.5	34	2.5	AGA	T	b	no	no	n	no	LIVE
45	NORMAL	25	38+6	G2P1L1	4756	no	no	no	adequate	12 HR 10 MIN	30.7 AM	not done	VD	R	I	9	Female	7.4	33	48	2.5	AGA	T	b	no	no	n	no	LIVE
46	NORMAL	20	38+1	PRIMI	1324	no	no	no	adequate	19 HR 30 MIN	15.4 AM	not done	VD	R	NI	9	Female	7.6	49	33	2.6	AGA	T	b	no	no	n	no	LIVE
1	HIGH RISK	37	38+6	PRIMI	666712	ELDERLY PRIMI	no	no	adequate	28 HR	30.4 AM	Precocious preg	LSCS	NR	NI	9	Female	7.8	32.7	47.5	2.75	AGA	T	b	no	no	n	no	LIVE

Sl.No	GROUP	maternal age in (yrs)	period of gestation (wk+day)	Gravidity	IP No	RISK	INTRAPARTUM FETAL DISTRESS	meconium stained	QUANTITY OF LIQUOR	interval nst at delivery	delivery time	LSCS indication	delivery mode	R/NR	Induced	APGAR AT 5	Sex	Foot length (cms)	Head circumference (cms)	Crown-heel length (cms)	Birth weight (kg)	Appropriate for gestational age	TERM	booked	rx infertility	NICU adms	no. of days in nicu	neonatal complications	LIVEORSTILLBIRTH
2	HIGH RISK	39	38+5	PRIMI	666742	IVF	no	no	adequate	11 HR	20.1 PM	Precocious preg	LSCS	R	NI	8	Male	8	34.5	48.5	3.25	AGA	T	b	no	no	n	no	LIVE
3	HIGH RISK	31	38+4	PRIMI	666546	ELDERLY PRIMI	no	no	adequate	17 HR 15 MIN	05.10 AM	failed ind	LSCS	R	II	8	Male	7.4	33.5	49	2.5	AGA	T	NB	no	no	nn	no	LIVE
4	HIGH RISK	33	38+2	PRIMI	666509	iugr	yes	no	LESS	33 HR 30MIN	23.8 AM	FD	LSCS	NR	NI	8	Male	8.2	35	50	3.25	AGA	T	b	no	yes	1	HIE	LIVE
5	HIGH RISK	31	38+1	PRIMI	666503	ELDERLY PRIMI	no	no	adequate	26 HR 10 MIN	40.9 AM	not done	VD	R	I	9	Female	8.1	34	49	3	AGA	T	b	no	no	n	no	LIVE
6	HIGH RISK	33	38+2	PRIMI	1421	ANEMIA	no	no	adequate	35 HR 30 MIN	35.4 PM	not done	VD	R	I	9	Female	6.7	31.5	46	2	SGA	T	b	no	no	n	no	LIVE
7	HIGH RISK	35	38+1	PRIMI	22716	ELDERLY PRIMI	no	no	adequate	70 HR 15 MIN	10.8 PM	not done	VD	R	NI	9	Female	7.6	32.5	46.5	2.6	AGA	T	b	no	no	n	no	LIVE
8	HIGH RISK	30	38+2	G3P2L2	666758	prev lscs	no	no	adequate	19 HR 10 MIN	25.10 PM	PREV LSCS	LSCS	R	NI	FD	Male	7.3	32.5	47	2.2	SGA	T	b	no	no	n	no	STILL
9	HIGH RISK	28	38+5	G3P2L2	3950	prev lscs	no	no	adequate	22 HR 20 MIN	20.1 AM	PREV LSCS	LSCS	R	NI	9	Female	8.1	34	50	3.2	AGA	T	b	no	no	n	no	LIVE
10	HIGH RISK	37	37+1	G3P2L2	23446	GDM	no	no	adequate	34 HR 10 MIN	35.10 AM	not done	VD	R	NI	9	Female	7.8	33	49	3	AGA	T	b	no	no	n	no	LIVE
11	HIGH RISK	30	38+6	PRIMI	1336	ELDERLY PRIMI	no	no	adequate	22 HR 15 MIN	45.9 AM	not done	VD	R	NI	9	Female	7.5	48	33	3	AGA	T	b	no	no	n	no	LIVE
12	HIGH RISK	22	38+1	PRIMI	4592	PRE ECLAMPSIA	yes	no	adequate	37 HR 15 MIN	40.4 AM	FD	LSCS	NR	I	6	Female	7.6	48	33	3	AGA	T	b	no	yes	n	no	LIVE
13	HIGH RISK	31	38+4	PRIMI	1359	thyroid	no	no	adequate	16 HR	20.2 PM	not done	VD	R	i	9	Female	7.6	49	33	2.6	AGA	T	b	no	no	n	no	LIVE
14	HIGH RISK	29	40+4	G1P1L1	23364	gdm	no	no	adequate	51 HR 10 MIN	20.1 AM	MACROSOMIA	LSCS	R	NI	9	Male	7.8	32.5	48.5	4	LGA	T	b	no	no	n	no	LIVE
15	HIGH RISK	33	38+1	PRIMI	666494	ELDERLY PRIMI	no	no	adequate	14 HR	25.1 PM	not done	VD	R	i	9	Female	7.5	48.5	34	2.5	AGA	T	b	no	no	n	no	LIVE
16	HIGH RISK	30	38+2	PRIMI	4590	gest htn	no	no	adequate	23 HR 30 MIN	40.2 PM	not done	VD	R	I	9	Male	7.4	33	48	2.5	AGA	T	b	no	no	n	no	LIVE
17	HIGH RISK	35	37+1	PRIMI	23418	IVF	no	no	LESS	26 HR	45.8 PM	FD	LSCS	NR	i	9	Female	7.8	49	33.3	2.6	AGA	T	b	no	no	n	no	LIVE
18	HIGH RISK	34	38+2	PRIMI	666415	ELDERLY PRIMI	no	no	adequate	64 HR	20.11 AM	on demand	LSCS	R	NI	7	Female	7.8	49.2	32.8	2.7	AGA	T	b	no	no	n	no	LIVE
19	HIGH RISK	30	37+4	PRIMI	3962	ELDERLY PRIMI	no	no	adequate	53 HR 10 MIN	10.1 AM	not done	VD	R	NI	9	Male	7.8	33.5	48	2.5	AGA	T	b	no	no	n	no	LIVE
20	HIGH RISK	29	38+1	PRIMI	1324	IVF	no	no	adequate	19 HR 30 MIN	15.4 AM	Precocious preg	LSCS	R	NI	9	Male	7.8	32.5	48.5	2.5	AGA	T	b	yes	no	n	no	LIVE
21	HIGH RISK	30	38+4	PRIMI	1342	ELDERLY PRIMI	no	yes	adequate	10 HR 10 MIN	55.8 AM	not done	VD	NR	I	9	Female	7.7	32.5	47.5	2.5	AGA	T	b	no	no	n	no	LIVE
22	HIGH RISK	25	38+1	PRIMI	4593	ELDERLY PRIMI	no	no	adequate	26 HR	45.5 PM	not done	VD	R	I	8	Male	8.3	33	49	2.7	AGA	T	b	no	no	n	no	LIVE

Sl.No	GROUP	maternal age in (yrs)	period of gestation (wk+day)	Gravidity	IP No	RISK	INTRAPARTUM FETAL DISTRESS	meconium stained	QUANTITY OF LIQUOR	interval nst at delivery	delivery time	LSCS indication	delivery mode	R/NR	Induced	APGAR AT 5	Sex	Foot length (cms)	Head circumference (cms)	Crown-heel length (cms)	Birth weight (kg)	Appropriate for gestational age	TERM	booked	rx infertility	NICU adms	no. of days in nicu	neonatal complications	LIVEORSTILLBIRTH
23	HIGH RISK	30	38+6	G2P1L1	4756	ELDERLY PRIMI	no	no	adequate	12 HR 10 MIN	30.7 AM	not done	VD	R	I	9	Female	7.5	32.5	48	2.7	AGA	T	b	no	no	n	no	LIVE
24	HIGH RISK	29	38+5	G3P2L2	666742	GDM	no	no	adequate	11 HR	20.1 PM	not done	VD	R	NI	7	Male	8	33	48.5	2.6	AGA	T	b	no	no	n	no	LIVE
25	HIGH RISK	21	38+4	PRIMI	666546	IUI	no	no	adequate	17 HR 15 MIN	05.10 AM	Precocious preg	LSCS	R	NI	8	Female	7.7	33	48	3	SGA	T	b	y	no	n	no	LIVE
26	HIGH RISK	22	36+5	PRIMI	666509	PRE ECLAMPSIA	yes	no	LESS	33 HR 30MIN	23.8 AM	not done	VD	NR	i	6	Male	7.4	33	48	2.1	SGA	T	b	no	yes	4	NEC	LIVE
27	HIGH RISK	26	38+1	PRIMI	666503	IVF	no	no	adequate	26 HR 10 MIN	40.9 AM	Precocious preg	LSCS	R	NI	9	Female	7.6	33.5	48.5	2.3	SGA	T	b	y	no	n	no	LIVE
28	HIGH RISK	22	38+2	PRIMI	1421	GDM	no	no	adequate	35 HR 30 MIN	35.4 PM	MACROSOMIA	LSCS	R	NI	9	Female	7.7	34	49	4	LGA	T	b	no	no	n	no	LIVE
29	HIGH RISK	28	40+1	PRIMI	22716	GDM	no	no	adequate	70 HR 15 MIN	10.8 PM	not done	VD	R	I	9	Female	8.3	35.2	50	3.6	AGA	POSTTERM	b	no	yes	1	no	LIVE
30	HIGH RISK	30	38+2	PRIMI	666758	ELDERLY PRIMI	yes	yes	adequate	19 HR 10 MIN	25.10 AMM	FD	LSCS	NR	NI	FD	Male	7.8	327	47.5	2.75	AGA	T	b	no	no	n	no	LIVE
31	HIGH RISK	30	38+5	PRIMI	3950	ELDERLY PRIMI	no	no	adequate	22 HR 20 MIN	20.1 AM	not done	VD	R	NI	9	Male	8	34.5	48.5	3.25	AGA	T	b	no	no	nn	no	LIVE
32	HIGH RISK	27	37+1	G3P2L2	23446	GDM	no	no	adequate	34 HR 10 MIN	35.10 AM	MACROSOMIA	LSCS	R	NI	9	Male	7.4	33.5	49	4	LGA	T	b	no	no	n	no	LIVE
33	HIGH RISK	23	38+6	PRIMI	1336	GDM	no	no	adequate	22 HR 15 MIN	45.9 AM	not done	VD	R	I	9	Male	8.2	35	50	3.5	AGA	T	b	no	no	n	no	LIVE
34	HIGH RISK	30	38+1	PRIMI	4592	IUGR	yes	no	adequate	37 HR 15 MIN	40.4 AM	FD	LSCS	NR	I	8	Male	8.1	34	49	2.3	SGA	T	b	no	yes	2	IVH	LIVE
35	HIGH RISK	21	38+4	PRIMI	1359	PRE ECLAMPSIA	no	no	adequate	16 HR	20.2 PM	not done	VD	R	I	9	Male	6.7	31.5	46	2	SGA	T	b	no	no	n	no	LIVE
36	HIGH RISK	29	37+3	G3P2L2	23364	PRE ECLAMPSIA	no	no	LESS	51 HR 10 MIN	20.1 AM	not done	VD	NR	NI	9	Female	7.6	32.5	46.5	2.2	SGA	T	b	no	no	n	no	LIVE
37	HIGH RISK	23	38+1	PRIMI	666494	gest htn	no	no	adequate	14 HR	25.1 PM	not done	VD	R	NI	9	Male	7.3	32.5	47	2.2	SGA	T	b	no	no	n	no	LIVE
38	HIGH RISK	20	38+2	PRIMI	4590	Abruptio	yes	no	adequate	23 HR 30 MIN	40.2 PM	FD	VD	NR	I	9	Male	8.1	34	50	3.2	AGA	T	b	no	yes	n	no	LIVE
39	HIGH RISK	28	37+1	G3P2L2	23418	ELDERLY PRIMI	yes	yes	adequate	26 HR	45.8 PM	FD	VD	NR	NI	8	Female	7.8	33	49	2.8	AGA	T	b	no	yes	2	MAS	LIVE
40	HIGH RISK	30	36+4	PRIMI	666415	ELDERLY PRIMI	yes	no	adequate	64 HR	20.11 AM	FD	LSCS	NR	NI	7	Male	7.5	48	33	3	AGA	T	b	no	yes	n	no	LIVE
41	HIGH RISK	30	37+4	PRIMI	3962	ANEMIA	no	no	adequate	53 HR 10 MIN	10.1 AM	not done	VD	R	NI	9	Female	7.8	33	49	2.8	AGA	T	b	no	no	n	no	LIVE
42	HIGH RISK	20	38+1	PRIMI	1324	GDM	no	NO	MORE	19 HR 30 MIN	15.4 AM	MACROSOMIA	LSCS	R	NI	9	Male	7.6	49	33	2	LGA	T	b	no	no	n	no	LIVE

Sl.No	GROUP	maternal age in (yrs)	period of gestation (wk+day)	Gravidity	IP No	RISK	INTRAPARTUM FETAL DISTRESS	meconium stained	QUANTITY OF LIQUOR	interval nst at delivery	delivery time	LSCS indication	delivery mode	R/NR	Induced	APGAR AT 5	Sex	Foot length (cms)	Head circumference (cms)	Crown-heel length (cms)	Birth weight (kg)	Appropriate for gestational age	TERM	booked	rx infertility	NICU adms	no. of days in nicu	neonatal complications	LIVEORSTILLBIRTH
43	HIGH RISK	30	38+4	PRIMI	1342	PRE ECLAMPSIA	yes	yes	LESS	10 HR 10 MIN	55.8 AM	FD	LSCS	NR	NI	7	Female	7.8	33	49	2	SGA	T	ub	no	yes	2	no	LIVE
44	HIGH RISK	18	38+1	PRIMI	4593	teenage	no	no	adequate	26 HR	45.5 PM	FD	LSCS	R	I	8	Male	7.5	48.5	34	2.5	AGA	T	b	no	no	n	no	LIVE
45	HIGH RISK	30	38+6	G2P1L1	4756	ELDERLY PRIMI	no	no	adequate	12 HR 10 MIN	30.7 AM	not done	VD	R	I	9	Female	7.4	33	48	2.5	AGA	T	b	no	no	n	no	LIVE
46	HIGH RISK	28	38+1	PRIMI	1324	Placenta previa	no	no	adequate	19 HR 30 MIN	15.4 AM	placenta previa	LSCS	R	NI	9	Female	7.6	49	33	2.6	AGA	T	b	no	no	n	no	LIVE